T.O. GR1F-16CJ-1CL-2

FLIGHT CREW CHECKLIST

HAF SERIES

F-16C/D

AIRCRAFT

BLOCK 52+

LOCKHEED MARTIN CORPORATION

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15 DECEMBER 2003

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INTRODUCTION

Refer to T.O. GR1F-16CJ-1 for a complete block designation code/serial number/tail number cross-reference listing.

This checklist does not replace the amplified version of the procedures in the Flight Manual. To fly the aircraft safely and efficiently, read and thoroughly understand why each step is performed and why it occurs in a certain sequence. Changes to the checklist are made automatically to reflect changes to the Flight Manual.

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SECTION N

NORMAL PROCEDURES

TABLE OF CONTENTS

COCKPIT DESIGNATION CODE

An asterisk (*) preceding steps is used to highlight procedures for D aircraft which apply to both cockpits.

PREFLIGHT CHECK

Check AFTO Form 781 for aircraft release and stores status.

EXTERIOR INSPECTION

Refer to figure N-3, page N-14.

COCKPIT ACCESS

1. Canopy – Open by positioning external canopy switch to the up position.
2. Ladder – Position on cockpit sill.

BEFORE ENTERING COCKPIT

*1. Ejection seat – Check.
2. MAIN PWR switch – OFF.

DR For solo flight:

3. Ejection seat – Safe, straps secure, pins removed.
4. CANOPY JETTISON T-handle – Secure, safety pin removed.
5. SPD BRK switch – Center.
6. FUEL MASTER switch – MASTER (guard down).
7. ENG CONT switch – NORM (guard down).
8. Audio panels – Set.
9. ALT GEAR handle – In.
10. ALT FLAPS switch – NORM.
11. GND JETT ENABLE switch – OFF.
12. DRAG CHUTE Switch – NORM.
13. HOOK switch – UP.
14. ARMT CONSENT switch – ARMT CONSENT (guard down).
15. EJECTION MODE SEL handle – SOLO.
16. Interior LIGHTING control panel – All knobs off.
17. OXYGEN REGULATOR – OFF and 100%.
18. Utility light – OFF and secured.

SECTION X

FAMILIARIZATION PROCEDURES

This section is furnished for familiarization use. It will normally be inserted between BEFORE ENTERING COCKPIT and COCKPIT INTERIOR CHECK. It may also be inserted in another part of the checklist, removed, parts removed, or discarded as desired.

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COCKPIT INTERIOR CHECK

*1. Loose or foreign objects – Check.
*2. Harness and personal equipment – Fasten.
*3. Rudder pedals – Adjust.

Left Console

1. PROBE HEAT switch – OFF.
2. DF STICK CONTROL switch – As briefed when DR occupied; FWD for solo flight.
3. FLCS PWR TEST switch – NORM.
4. DEFOG lever – Midrange.
5. DIGITAL BACKUP switch – OFF.
*6. ALT FLAPS switch – NORM.
7. MANUAL TF FLY UP switch – ENABLE.
8. LE FLAPS switch – AUTO.
9. BIT switch – OFF.
10. TRIM/AP DISC switch – NORM.
11. ROLL, YAW, and PITCH TRIM – Center.
*12. FUEL MASTER switch – MASTER (guard down and C DF safety-wired).
13. TANK INERTING switch – OFF.
14. ENG FEED knob – NORM.
15. AIR REFUEL switch – CLOSE.
16. IFF MASTER knob – STBY.
17. C & I knob – BACKUP.
*18. TACAN – As desired.
19. EXT LIGHTING control panel – As required.
20. MASTER light switch – NORM.
21. EPU switch – NORM (guard down).
22. MAIN PWR switch – OFF.
23. AVTR power switch – OFF.
24. VIDEO SELECT knob – HUD.
25. ECM power – Off.
*26. COMM 1 power knob – CW.
*27. COMM 1 mode knob – SQL.
*28. COMM 2 power knob – CW.
*29. COMM 2 mode knob – SQL.
*30. TACAN power knob – CW.
31. C DF AB RESET switch – NORM.
32. C DF ENG CONT switch – PRI (guard down).
33. DR ENG CONT switch – NORM (guard down).

(Cont)

34. JFS switch – OFF.
35. UHF radio backup control panel:
    a. Function knob – BOTH.
    b. Frequency – As desired.
36. Throttle – Verify freedom of motion, then OFF.
*37. SPD BRK switch – Forward.
*38. DOG FIGHT switch – Center.

Left Auxiliary Console

*1. ALT GEAR handle – In.
2. CMDS switches (9) – OFF.
3. RF switch – NORM.
4. STORES CONFIG switch – As required.
5. LANDING TAXI LIGHTS switch – OFF.
*6. LG handle – DN.
*7. GND JETT ENABLE switch – OFF.
8. BRAKES channel switch – CHAN 1.
9. ANTI-SKID switch – ANTI-SKID.
*10. EMER STORES JETTISON button – Cover intact.
*11. HOOK switch – UP.
12. SYMBOLOGY power knob – OFF.

Instrument Panel

1. ROLL switch – ATT HOLD.
2. PITCH switch – A/P OFF.
3. MASTER ARM switch – OFF.
4. DR ARMT CONSENT switch – ARMT CONSENT (guard down).
5. LASER ARM switch – OFF.
6. DRAG CHUTE switch – NORM.
*7. HUD/ASHM – Set.
*8. Altimeter – Set.
9. FUEL QTY SEL knob – NORM.
10. EXT FUEL TRANS switch – NORM.
*11. INSTR MODE knob – As desired.

Right Auxiliary Console

*1. Clock – Set.
2. DR EJECTION MODE SEL handle – NORM or AFT (as briefed).

Right Console

1. SNSR PWR switches (4) – OFF.
2. HUD control panel – Set.
3. NUCLEAR CONSENT switch – OFF (guard down).
4. ZEROIZE switch – OFF.

*5. Wristrest and armrest – As desired.

*6. Interior LIGHTING control panel – As desired.

7. C DF VOICE MESSAGE switch – VOICE MESSAGE.
8. TEMP knob – AUTO.
9. AIR SOURCE knob – NORM.
10. AVIONICS POWER switches (8) – OFF.
11. ANTI ICE switch – AUTO/ON.
12. IFF ANT SEL switch – NORM.
13. UHF ANT SEL switch – NORM.

COCKPIT INTERIOR CHECK

1. Interior check – Complete.

AFTER COCKPIT CHECK IS COMPLETE – VERIFY

*1. FUEL MASTER switch – MASTER (guard down and [C] [DF] safety-wired).
2. ENG FEED knob – NORM.
3. EPU switch – NORM (guard down).
4. [C] [DF] ENG CONT switch – PRI (guard down).
5. [DR] ENG CONT switch – NORM (guard down).
*6. Throttle – OFF.
*7. LG handle – DN.
*8. HOOK switch – UP.
9. MASTER ARM switch – OFF.
10. AIR SOURCE knob – NORM.
*11. Loose or foreign objects – Check.

BEFORE STARTING ENGINE

1. MAIN PWR switch – BATT.
2. FLCS PWR TEST switch – TEST and hold.
3. FLCS PWR TEST switch – Release.
4. MAIN PWR switch – MAIN PWR.
5. EPU GEN and EPU PMG lights – Confirm off.
6. Communications – Established.
7. Canopy – As desired.
8. Chocks in place, fireguard posted, and intake and other danger areas clear (ground crew).

STARTING ENGINE

1. JFS switch – START 2.
2. SEC caution light – Check off.
3. Throttle – Advance to IDLE at 20 percent rpm minimum.
4. ENGINE warning light – Off (approximately 55 percent rpm).

(Cont)

*Engine at idle and check:

5. JFS switch – Confirm OFF.
6. HYD/OIL PRESS warning light – Off.
7. FUEL FLOW – 500-1500.
8. OIL pressure – 15 psi (minimum).
9. NOZ POS – Greater than 80 percent.
10. RPM – 65-77 percent.
11. FTIT – 625°C or less.
12. HYD PRESS A & B – 2850-3250 psi.
13. Six fuel pump lights (ground crew) – On.
14. Main fuel shutoff valve (ground crew) – Check.
15. JFS doors (ground crew) – Verify closed.
16. Throttle cutoff release – Check.

AFTER ENGINE START

1. TEST switch panel – Check.
   a. PROBE HEAT switch – PROBE HEAT.
   b. PROBE HEAT switch – TEST.
   c. PROBE HEAT switch – OFF.
   d. FIRE & OHEAT DETECT button – Test.
   e. MAL & IND LTS button – Test.
2. AVIONICS POWER panel – Set.
   a. MMC switch – MMC.
   b. ST STA switch – ST STA.
   c. MFD switch – MFD.
   d. UFC switch – UFC.
   e. GPS TRK switch – GPS TRK.

(Cont)

3. EGI – Align after display visible on the DED.
4. SNSR PWR panel:
   a. LEFT HDPT switch – OFF, unless required.
   b. RIGHT HDPT switch – As required.
   c. FCR switch – FCR.
   d. RDR ALT switch – RDR ALT.

*5. HUD/ASHM – As desired.

6. C & I knob – UFC.
7. MFL – Clear.
8. SEC – Check after the engine has run at idle for at least 30 seconds. May be delayed until the BEFORE TAKEOFF checklist.
9. Flight controls – Cycle.
10. FLCS BIT – Initiate and monitor.
11. ECM panel – As required.
12. SPD BRK switch – Cycle.

*13. WHEELS down lights – Three green.

*14. SAI – Set.

15. FUEL QTY SEL knob – Check.
16. EPU FUEL quantity – 95-102 percent.
17. Avionics – Program as required and verify (manual or data transfer cartridge).

*18. MFD’s – As desired.

19. VHF radio – As desired.

After FLCS BIT completed:

*20. DBU – Check:
   a. DIGITAL BACKUP switch – BACKUP.
   b. Operate controls – All surfaces respond normally.
   c. DIGITAL BACKUP switch – OFF.

21. Trim – Check.

(Cont)

*22. D FLCS override – Check.
*23. MPO – Check.
*24. Operate controls – All surfaces respond normally; no FLCS lights on.
*25. AR system (if required) – Check.
*26. Brakes – Check both channels; then return to CHAN 1.
27. Anti-ice – Check.
28. EPU GEN and EPU PMG lights – Confirm off.
29. EPU switch – OFF.
30. Ground safety pins (ground crew) – Remove.
31. EPU switch – NORM.
32. Intercom (ground crew) – Disconnect.
33. Avionic BIT's – As desired.
34. C DF Seat – Adjust to design eye.
35. OBOGS – Check (at least 2 minutes after engine start).

BEFORE TAXI

1. Canopy – Close and lock.
2. HAVE QUICK radio – Set and check (if required).
*3. Altimeter and altitude indications – Set and check.
4. Exterior lights – As required.
5. EGI knob – NAV.
6. Chocks (ground crew) – Remove.

TAXI

*1. Brakes and NWS – Check.
*2. Heading – Check.
*3. Flight instruments – Check for proper operation.

BEFORE TAKEOFF

*1. ALT FLAPS switch – NORM.
2. MANUAL TF FLYUP switch – ENABLE.
3. Trim – Check pitch and yaw trim centered and roll trim as required. Refer to figure N-1, page N-7.
4. C DF ENG CONT switch – PRI (guard down).
5. DR ENG CONT switch – NORM (guard down).
6. Speedbrakes – Closed.
7. Canopy – Close, lock, light off.
8. IFF – Set and check.
9. External tanks (if installed) – Verify feeding.
10. FUEL QTY SEL knob – NORM.
11. STORES CONFIG switch – As required.
*12. GND JETT ENABLE switch – As required.
*13. Harness, leads, and anti-g system – Check.
14. EPU – Check.
15. FLIR – As required.
16. TFR – As required.
17. PROBE HEAT switch – PROBE HEAT.
*18. Ejection safety lever – Arm (down).
*19. Flight controls – Cycle.
*20. OIL pressure – Check psi.
*21. ALOW MSL FLOOR Data – Check.
*22. All warning and caution lights – Check.
23. Adjustable sliding holder (when utility light is not in use) – C DF Full forward, rotated cw, and secured.
24. TGP – Stow.

Takeoff Roll Trim With Asymmetric Stores

DATA BASIS FLIGHT TEST

CONFIGURATION:

- **LEF'S SCHEDULED**
- **TEF'S AT 20 DEGREES**

NOTES:

- INCREASE TAKEOFF SPEED 2 KTS FOR EACH DOT OF ROLL TRIM APPLIED TO COMPENSATE FOR REDUCED LIFT. TAKEOFF DISTANCE INCREASES PROPORTION– ATELY TO THE SPEED INCREASE.
- IT IS POSSIBLE TO EXCEED THE LATERAL TRIM AU– THORITY OF THE AIRCRAFT FOR ONSPEED TAKEOFF WITH A NET ASYMMETRIC (ROLLING) MOMENT LESS THAN AIRCRAFT TAKEOFF LIMITS.

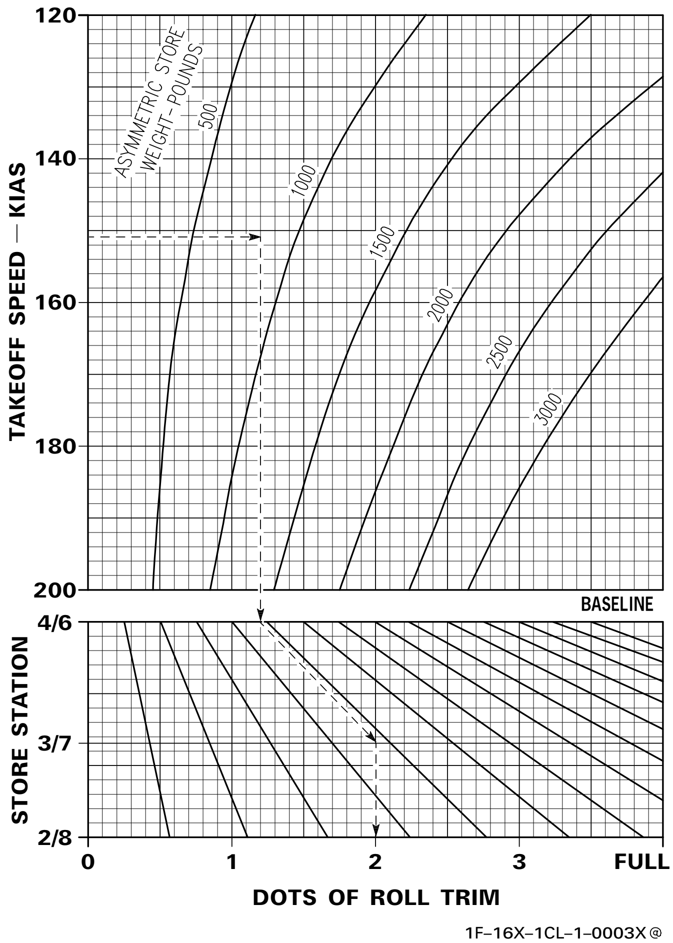
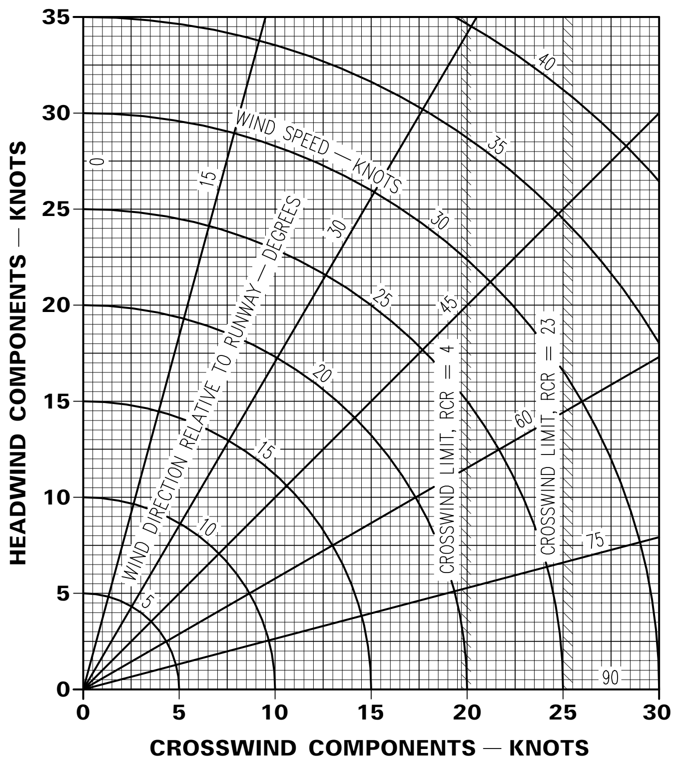


Figure N-1.

Takeoff and Landing Crosswind Limits

NOTES:

- CROSSWIND LIMITS FOR RCR VALUES 4-23 MAY BE OBTAINED BY INTERPOLATING BETWEEN THE LIMITS SHOWN.
- ENTER CHART WITH STEADY WIND TO DETERMINE HEADWIND COMPONENT AND WITH MAXIMUM GUST VELOCITY TO DETERMINE CROSSWIND COMPONENT.



1F-16X-1CL-1-0004A @

Figure N-2.

CLIMB/IN-FLIGHT/OPERATIONAL CHECKS

1. Fuel – Check quantity/transfer/balance.
2. FUEL QTY SEL knob – NORM.
3. Oxygen system – Check.
4. Cockpit pressurization – Check.
5. Engine instruments – Check.

DESCENT/BEFORE LANDING

1. Fuel – Check quantity/transfer/balance.
2. Final approach airspeed – Compute.
3. DEFOG lever/cockpit heat – As required.
4. Landing light – On.

*5. Altimeter and altitude indications – Check altimeter setting, ELECT versus PNEU mode altimeter readings, and ELECT mode altitude versus altitude displayed in HUD.

*6. Attitude references – Check ADI/HUD/SAI.

7. ANTI ICE switch – As required.
8. TGP – Stow.

AFTER LANDING

1. DRAG CHUTE switch – NORM/REL as required.
2. PROBE HEAT switch – OFF.
3. ECM power – Off.
4. Speedbrakes – Close.

*5. Ejection safety lever – Safe (up).

6. IFF MASTER knob – STBY.
7. IFF M-4 CODE switch – HOLD.
8. LANDING TAXI lights – As required.
9. ZEROIZE switch – As required.
10. Canopy handle – Up.
11. Armament switches – Off, safe, or normal.

PRIOR TO ENGINE SHUTDOWN

1. EPU safety pin (ground crew) – In.
2. EGI – Check.
3. MFL – Record (as required).
4. AVTR power switch – UNTHRD.
5. C & I knob – BACKUP.
6. EGI knob – OFF.
7. Avionics – OFF.

ENGINE SHUTDOWN

1. Throttle – OFF.
2. JFS RUN light – Check.

After main generator drops off line:

3. EPU GEN and EPU PMG lights – Confirm off.
4. MAIN PWR switch – OFF.
5. Oxygen hose, survival kit straps, lapbelt, g-suit hose, and vest hose – Disconnect, stow.
6. OXYGEN REGULATOR – OFF and 100%.
7. Canopy – Open.

SCRAMBLE

PREFLIGHT

Perform the following preflight inspections prior to placing the aircraft on quick response status:

1. EXTERIOR INSPECTION.
2. BEFORE ENTERING COCKPIT.
3. COCKPIT INTERIOR CHECK.
4. BEFORE STARTING ENGINE.
5. STARTING ENGINE.
6. AFTER ENGINE START (include EPU check but do not remove MLG ground safety pins).
7. Aircraft cocked for scramble – Per local policies and directives.

AIRCRAFT ON QUICK RESPONSE STATUS

If the above actions were not completed prior to scramble, normal preflight procedures should be used.

1. FLCS power – Check.
2. MAIN PWR switch – MAIN PWR.
3. Engine – Start.
4. Canopy – Close and lock.
5. Instruments – Check.
6. SNSR PWR switches – As required.
7. AVIONICS POWER switches – As required.
8. EGI knob – STOR HDG.
9. FLCS BIT – Accomplish.
10. MFD's – As desired.

(Cont)

11. SMS – As desired.
*12. HUD/ASHM – As required.
13. EGI knob – NAV.
14. EPU GEN and EPU PMG lights – Confirm off.
15. EPU – Check (if EPU safety pin was installed since last EPU check).
16. Chocks and safety pins (ground crew) – Remove.
*17. Brakes and NWS – Check.
*18. Ejection safety lever – Armed (down).
*19. Flight control surfaces – Cycle.
20. IFF – As required.

HOT REFUELING

PRIOR TO HOT PIT ENTRY

1. AFTER LANDING checks – Complete.
2. AIR REFUEL switch – OPEN; RDY light on.
*3. TACAN power knob – OFF.
*4. GND JETT ENABLE switch – OFF.

PRIOR TO HOT REFUELING

Perform the following actions prior to refueling:

1. EPU safety pin (ground crew) – Installed.
*2. Personal equipment leads (except oxygen and communication) – As desired.
3. Canopy – As desired.
4. Brake and tire inspection (ground crew) – Complete.
5. Intercom with refueling supervisor – Established.

DURING HOT REFUELING

*1. Be alert for visual or voice signals from refueling supervisor.
*2. Terminate refueling if intercom contact is lost – Visual signal.
*3. Ground control radio frequency – Monitor.
*4. Insure hands are visible to ground crew.

HOT REFUELING COMPLETE

1. AIR REFUEL switch – CLOSE.
2. EPU GEN and EPU PMG lights – Confirm off.
3. EPU switch – OFF.
4. EPU safety pin (ground crew) – Removed.
5. EPU switch – NORM.
6. Intercom (refueling supervisor) – Disconnect.
7. Taxi clear of refueling area and configure aircraft as required.

QUICK TURNAROUND

PRIOR TO ENGINE SHUTDOWN

1. AFTER LANDING checks – Complete.
2. PRIOR TO ENGINE SHUTDOWN checks – Complete.
3. Communication with ground crew – Establish (if required).
4. ENGINE SHUTDOWN checks – Complete.
5. Aircraft setup – IAW local procedures.

SUPPLEMENTAL PROCEDURES

ILS PROCEDURES

1. DED – Verify CNI display.
2. T-ILS button – Depress and release.
3. ILS frequency – Key in and ENTR.
4. DCS – Position asterisks about selectable items.
5. HSI – Set inbound localizer course.
6. INSTR MODE knob – ILS/TCN or ILS/NAV.

EXTERIOR INSPECTION

Refer to figure N-3, page N-14.

AIRCRAFT SERVICING

Refer to figure N-7, page N-19.

TAKEOFF AND LANDING DATA CARD

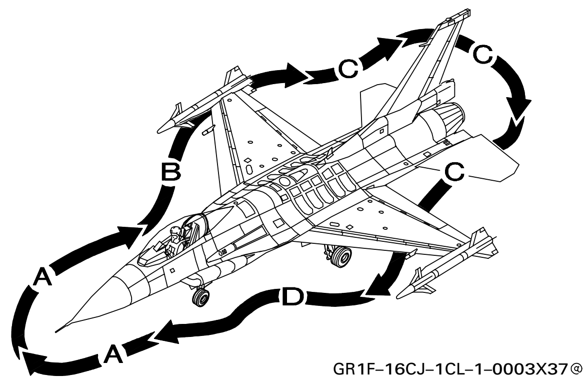
Refer to figure N-8, page N-20.

STRANGE FIELD PROCEDURES

Refer to Air Force/Command guidance.

Exterior Inspection (Typical)

NOTE: Check aircraft for loose doors and fasteners, cracks, dents, leaks, and other discrepancies.



NOSE – A

1. FORWARD FUSELAGE:
   - A. EXTERNAL CANOPY JETTISON D-HANDLES (2) – ACCESS DOORS CLOSED.
   - B. PITOT-STATIC PROBES (2) – COVERS REMOVED.
   - C. AOA PROBES (2) – COVERS REMOVED; SLOTS CLEAR; FREEDOM OF MOVEMENT CHECKED; ALIGN- MENT CHECKED (ROTATE PROBES FULLY TOWARD FRONT OF AIRCRAFT (CCW ON THE LEFT; CW ON THE RIGHT) AND VERIFY BOTTOM SLOTS SLIGHTLY AFT OF 6 O'CLOCK AND TOP SLOTS FORWARD); SET IN NEUTRAL POSITION (BOTTOM SLOT AT 4 O'CLOCK ON THE RIGHT SIDE AND 8 O'CLOCK ON THE LEFT SIDE).
   - D. STATIC PORTS (2) – CONDITION.
   - E. RADOME – SECURE.
   - F. ENGINE INLET DUCT – CLEAR.
   - G. PODS AND PYLONS – SECURE (PREFLIGHT IAW T.O. GR1F-16CJ-34-1-1CL-1).
   - H. EPU FIRED INDICATOR – CHECK.
   - I. ECS RAM INLET DUCTS – CLEAR.

Figure N-3. (Sheet 1)

Exterior Inspection (Typical)

CENTER FUSELAGE & RIGHT WING – B

1. RIGHT MLG:
   A. TIRE, WHEEL, AND STRUT – CONDITION.
   B. UPLOCK ROLLER – CHECK.
   C. DOOR AND LINKAGE – SECURE.
   D. LG SAFETY PIN – INSTALLED.
2. RIGHT WING:
   A. HYDRAZINE LEAK DETECTOR – CHECK.
   B. EPU NITROGEN BOTTLE – CHARGED (REFER TO FIGURE N-5).
   C. EPU OIL LEVEL – CHECK.
   D. HYD SYS A QTY AND ACCUMULATOR – CHECK.
   E. GUN-RNDS COUNTER AND RNDS LIMIT – SET.
   F. EPU EXHAUST PORT – CONDITION.
   G. LEF – CONDITION.
   H. STORES AND PYLONS – SECURE (PREFLIGHT IAW T.O. GR1F-16CJ-34-1-1CL-1).
   I. NAV AND FORM LIGHTS – CONDITION.
   J. FLAPERON – CONDITION.

AFT FUSELAGE – C

1. TAIL:
   A. ADG – CHECK.
   B. CSD OIL LEVEL – CHECK.
   C. BRAKE/JFS ACCUMULATORS – CHARGED (REFER TO FIGURE N-4).
   D. HOOK – CONDITION AND PIN FREE TO MOVE.
   E. DRAG CHUTE ACCUMULATOR – CHARGED.
   F. VENTRAL FINS, SPEEDBRAKES, HORIZONTAL TAILS, AND RUDDER – CONDITION.
   G. DRAG CHUTE HOUSING – CONDITION.
   H. ENGINE EXHAUST AREA – CONDITION.
   I. NAV AND FORM LIGHTS – CONDITION.
   J. VERTICAL TAIL LIGHT – CONDITION.
   K. DRAG CHUTE/FLCS ACCUMULATORS – CHARGED (REFER TO FIGURE N-6).
   L. JFS DOORS – CLOSED.

Figure N-3. (Sheet 2)

Exterior Inspection (Typical)

LEFT WING & CENTER FUSELAGE – D

1. LEFT WING:
   - A. FLAPERON – CONDITION.
   - B. NAV AND FORM LIGHTS – CONDITION.
   - C. STORES AND PYLONS – SECURE (PREFLIGHT IAW T.O. GR1F-16CJ-34-1-1CL-1).
   - D. LEF – CONDITION.
   - E. FUEL VENT OUTLET – CLEAR.
   - F. HYD SYS B QTY AND ACCUMULATOR – CHECK.
2. LEFT MLG:
   - A. TIRE, WHEEL, AND STRUT – CONDITION.
   - B. UPLOCK ROLLER – CHECK.
   - C. DOOR AND LINKAGE – SECURE.
   - D. LG SAFETY PIN – INSTALLED.
   - E. LG PIN CONTAINER – CHECK CONDITION.
3. FUSELAGE:
   - A. GUN PORT – CONDITION.
   - B. IFF – CHECK.
   - C. AVTR – CHECK.
   - D. DOOR 2317, ENGINE AND EMS GO-NO-GO INDICATORS – CHECK.
4. UNDERSIDE:
   - A. NLG TIRE, WHEEL, AND STRUT – CONDITION.
   - B. NLG TORQUE ARMS – CONNECTED, PIN SECURE, AND SAFETIED.
   - C. NLG DOOR AND LINKAGE – SECURE.
   - D. LANDING AND TAXI LIGHTS – CONDITION.
   - E. LG/HOOK EMERGENCY PNEUMATIC BOTTLE PRESSURE – WITHIN PLACARD LIMITS (REFER TO FIGURE N-5).

Figure N-3. (Sheet 3)

Brake/JFS Accumulators Pneumatic Servicing

TEMPERATURE °F	PRESSURE PSIG
−44 to −36	1475-1625
−35 to −27	1525-1675
−26 to −18	1575-1725
−17 to −9	1625-1775
−8 to −1	1675-1825
0 to 8	1725-1875
9 to 17	1775-1925
18 to 26	1825-1975
27 to 35	1875-2025
36 to 44	1925-2075
45 to 53	1975-2125
54 to 62	2025-2175
63 to 71	2075-2225
72 to 80	2125-2275
81 to 89	2175-2325
90 to 98	2225-2375
99 to 107	2275-2425
108 to 116	2325-2475
117 to 125	2375-2525
126 to 135	2425-2575

Figure N-4.

EPU Nitrogen & Alternate LG/Hook Bottles Pneumatic Servicing

TEMPERATURE °F	PRESSURE PSIG
100 and higher 50 to 100 10 to 50 –60 to +10	3250-3500 2850-3250 2500-2850 2000-2500

Figure N-5.

Drag Chute/FLCS Accumulators Pneumatic Servicing

TEMPERATURE °F	PRESSURE PSIG
100 and higher 50 to 100 10 to 50 –60 to +10	1300-1400 1200-1300 1100-1200 950-1100

Figure N-6.

Aircraft Servicing

SERVICEABLE ITEM		SPECIFICATIONS	
		USAF	NATO
FUEL	ENGINE/JFS	MIL-T-5624, JP-4 MIL-T-5624, JP-5 MIL-T-83133, JP-8 JET A, B (COMMERCIAL) JET A-1 (COMMERCIAL)	F-40 F-43 OR F-44 F-34 NONE F-35
OIL	ENGINE *	MIL-L-7808J OR LATER	0-148
	ADG/CSD/EPU	MIL-L-7808	
HYDRAULIC FLUID	HYDRAULIC SYSTEMS A AND B	MIL-H-5606 MIL-H-83282	H-515 H-537
OXYGEN	GASEOUS	MIL-O-27210, TYPE I	NONE
EXTERNAL ELECTRICAL POWER	115 (±15) VAC, 400 (±30) HZ	A/M32A-60A	NONE
NITROGEN	GASEOUS	BB-N-441A, TYPE I, GRADE B	NONE
FUEL TANK INERTING AGENT (OPTIONAL)	LIQUID	HALON 1301	NONE
MONOPROPELLANT (EPU)	LIQUID	HYDRAZINE (70% N_2H_4, 30% H_2O)	NONE

* IF NECESSARY, ENGINE LUBRICATING OILS MIL-L-7808 (NATO CODE 0-148) AND MIL-L-23699 (NATO CODE 0-156) MAY BE MIXED. AT THE FIRST OPPORTUNITY THEREAFTER, THE OIL SHALL BE DRAINED AND FLUSHED, AND THE ENGINE SERVICED WITH THE PROPER LUBRICATING OIL AS SPECIFIED IN THE APPLICABLE ENGINE TECHNICAL ORDERS.

Figure N-7.

Takeoff and Landing Data Card

CONDITIONS

	TAKEOFF	LANDING
GW	______	______
Runway Condition	______	______
Runway Temp	______	______
Pressure Altitude	______	______
Wind	______	______
Runway Length	______	______
Runway Slope	______	______

TAKEOFF

Rotation Speed . . . . . . ______ KIAS

Takeoff Speed/Dist . . ______ KIAS ______ FEET

Refusal Speed . . . . ______ KIAS

Max Brake Speed . . . ______ KIAS

LANDING

	Immediately After Takeoff	Final Landing
	GW ______	GW ______
Approach Speed	______	______
Touchdown Speed	______	______
Landing Distance	______	______

Figure N-8.

SECTION P/PW

PERFORMANCE DATA

F100-PW-229

TABLE OF CONTENTS

Takeoff Factor

DATA BASIS FLT TEST **ENGINE F100–PW–229**

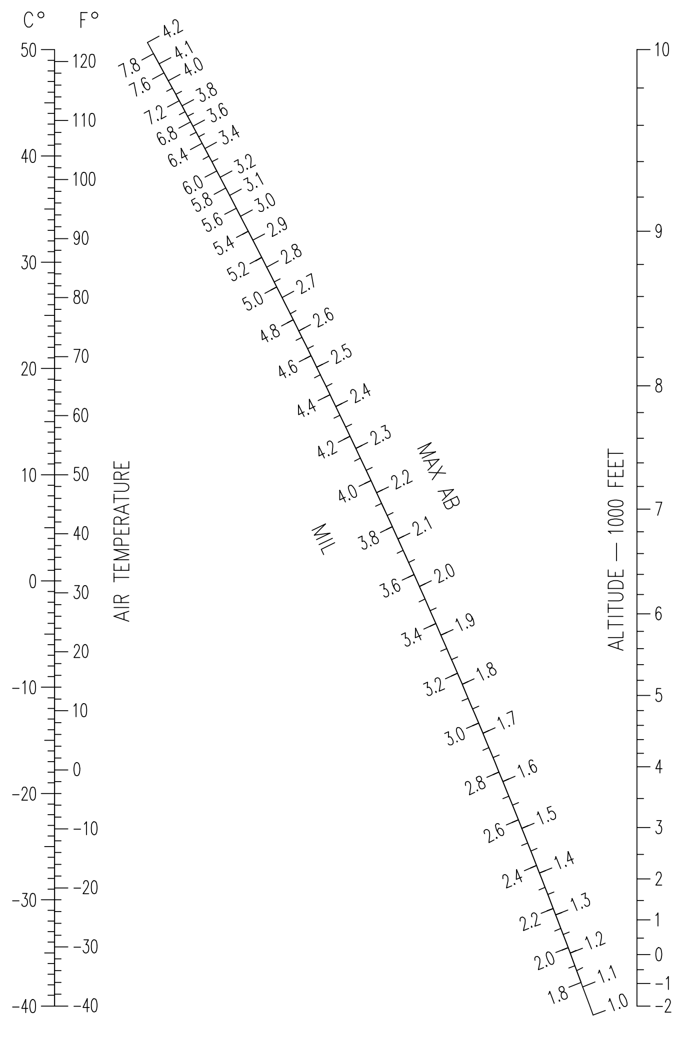


Figure P-1.

Takeoff Speed and Distance

DATA BASIS FLT TEST **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **CG = 35% MAC**
- **ZERO ROLL TRIM**

CONDITIONS:
- **ALL ALTITUDES**
- **ALL TEMPERATURES**
- **10 DEGREES PITCH ATTITUDE**

NOTES:
Refer to sheet 2.

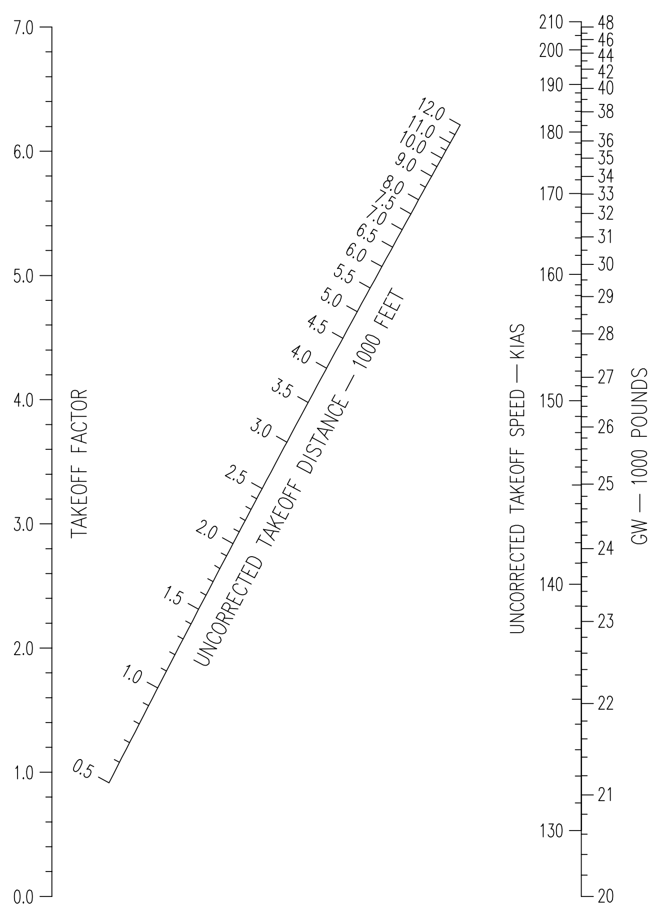


Figure P-2. (Sheet 1)

Takeoff Speed and Distance

DATA BASIS FLIGHT TEST **ENGINE F100-PW-229**

CONFIGURATION:

- **ALL DRAG INDEXES**
- **CG=35% MAC**
- **ZERO ROLL TRIM**

CONDITIONS:

- **ALL ALTITUDES**
- **ALL TEMPERATURES**
- **10 DEGREES PITCH ATTITUDE**

NOTES:

- ROTATE AT 10 KIAS (NON-AB) OR 15 KIAS (AB) LESS THAN TAKEOFF SPEED.
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- INCREASE TAKEOFF SPEED 8% AND DISTANCE 18% FOR AN 8° PITCH ATTITUDE ROTATION.
- INCREASE/DECREASE TAKEOFF SPEED 0.8 KIAS FOR EACH 1% FORWARD/AFT OF 35% MAC.
- INCREASE/DECREASE DISTANCE 1% FOR EACH 1% FORWARD/AFT OF 35% MAC.
- INCREASE DISTANCE 2% PER 100 DRAG INDEX.
- INCREASE DISTANCE 4% PER 1% UPSLOPE.
- DECREASE DISTANCE 3.5% PER 1% DOWNSLOPE.
- INCREASE DISTANCE 11% PER 10 KTS TAILWIND.
- DECREASE DISTANCE 10% PER 10 KTS HEADWIND.
- FOR TAKEOFF SPEED CORRECTION WITH ROLL TRIM OTHER THAN ZERO, REFER TO TAKEOFF ROLL TRIM WITH ASYMMETRIC STORES, FIGURE N-1, PAGE N-8.

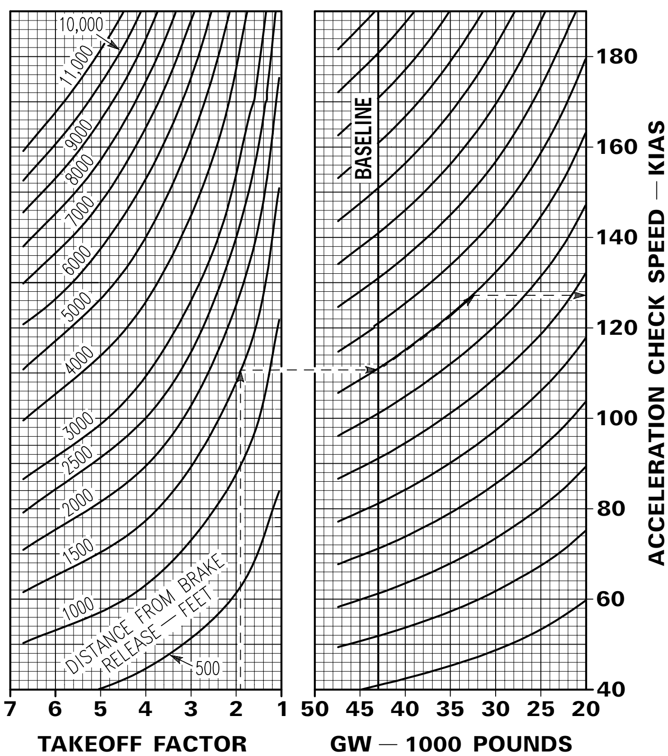
Figure P-2. (Sheet 2)

Acceleration Check Speed

DATA BASIS FLT TEST **ENGINE F100–PW–229**

NOTES:

- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE SPEED 1% PER 100 DRAG INDEX.
- INCREASE SPEED 7.6 KIAS PER 10 KTS HEADWIND.
- DECREASE SPEED 7.7 KIAS PER 10 KTS TAILWIND.
- INCREASE SPEED 3.4% PER 1% DOWNHILL SLOPE.
- DECREASE SPEED 3.5% PER 1% UPHILL SLOPE.



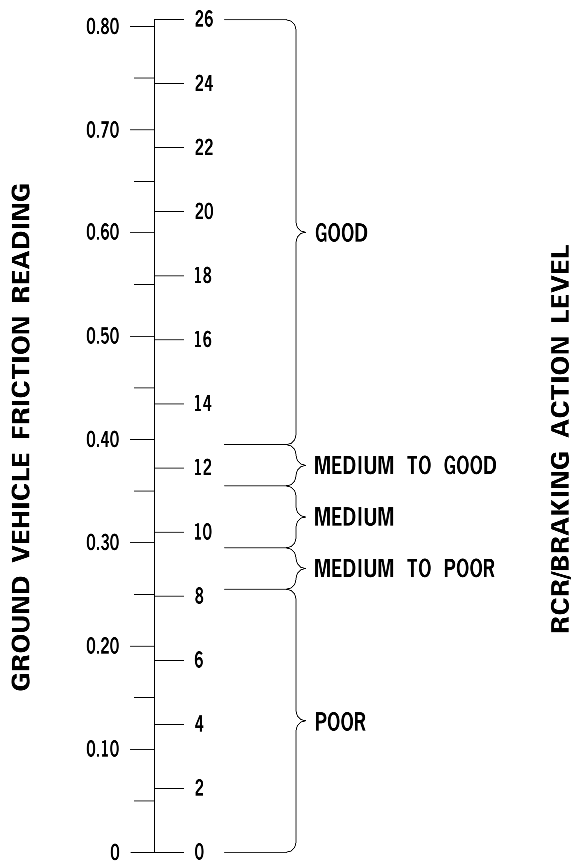
1F–16CJ–1CL–1–0005B@

Figure P-3.

Ground Vehicle Friction Reading-To-RCR Conversion

NOTES:

- IN MANY AREAS, GROUND VEHICLE FRICTION READING IS THE ONLY AVAILABLE MEASURE FOR RUNWAY BRAKING ACTION.
- NORMALLY THE GROUND VEHICLE FRICTION READING, ALSO REFERRED TO AS BRAKING ACTION COEFFICIENT, IS GIVEN AS WHOLE NUMBERS, NOT AS DECIMALS (I.E., 40 INSTEAD OF 0.40).



1F-16X-1CL-1-0005X@

Figure P-4.

Refusal Speed

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **GW = 32,000 LB**

CONDITIONS:
- **IDLE SELECTED AT REFUSAL SPEED**
- **MAX EFFORT BRAKING**
- **DRY CONCRETE (RCR = 23)**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- FOR RCR = 16 (DRY) DECREASE NON–AB/AB REFUSAL SPEED BY 4/5 KIAS.
- INCREASE/DECREASE REFUSAL SPEED 1.1%/0.9% WITH NON–AB AND 0.7%/0.7% WITH AB PER 1000 LB LESS/ ADDITIONAL GW.
- INCREASE/DECREASE REFUSAL SPEED 5/5 KIAS WITH NON–AB AND 6/6 KIAS WITH AB PER 5 KTS HEADWIND/TAILWIND.
- INCREASE/DECREASE REFUSAL SPEED 0.5/1.0 KIAS WITH NON–AB AND 1.5/2.0 KIAS WITH AB PER 1% UPSLOPE/ DOWNSLOPE.

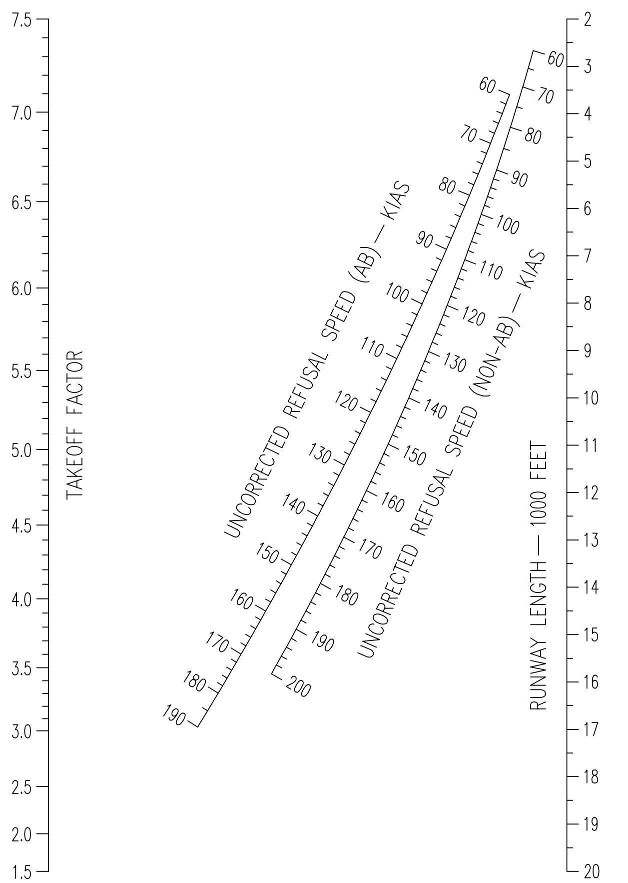


Figure P-5. (Sheet 1)

Refusal Speed

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **GW = 32,000 LB**

CONDITIONS:
- **IDLE SELECTED AT REFUSAL SPEED**
- **MAX EFFORT BRAKING**
- **WET CONCRETE (RCR = 18)**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- FOR RCR = 12 (WET) DECREASE NON–AB/AB REFUSAL SPEED BY 9/10 KIAS.
- INCREASE/DECREASE REFUSAL SPEED 0.6%/0.4% WITH NON–AB AND 0.2%/0.2% WITH AB PER 1000 LB LESS/ ADDITIONAL GW.
- INCREASE/DECREASE REFUSAL SPEED 6/7 KIAS WITH NON–AB AND 7/8 KIAS WITH AB PER 5 KTS HEADWIND/TAILWIND.
- INCREASE/DECREASE REFUSAL SPEED 2.5/4.5 KIAS WITH NON–AB AND 4.0/5.5 KIAS WITH AB PER 1% UPSLOPE/ DOWNSLOPE.

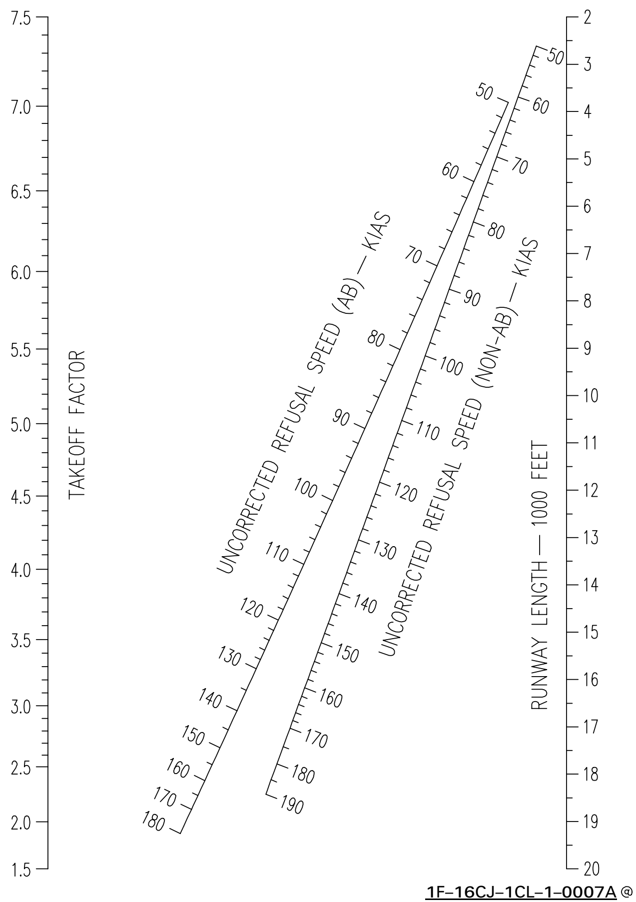


Figure P-5. (Sheet 2)

Refusal Speed

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **GW = 32,000 LB**

CONDITIONS:
- **IDLE SELECTED AT REFUSAL SPEED**
- **MAX EFFORT BRAKING**
- **SNOW (RCR = 8)**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- INCREASE/DECREASE REFUSAL SPEED 0.6%/0.5% WITH NON–AB AND 0.1%/0.2% WITH AB PER 1000 LB LESS/ ADDITIONAL GW.
- INCREASE/DECREASE REFUSAL SPEED 6/7 KIAS WITH NON–AB AND 7/7 KIAS WITH AB PER 5 KTS HEADWIND/TAILWIND.
- INCREASE/DECREASE REFUSAL SPEED 3/5 KIAS WITH NON–AB AND 4/6 KIAS WITH AB PER 1% UPSLOPE/ DOWNSLOPE.

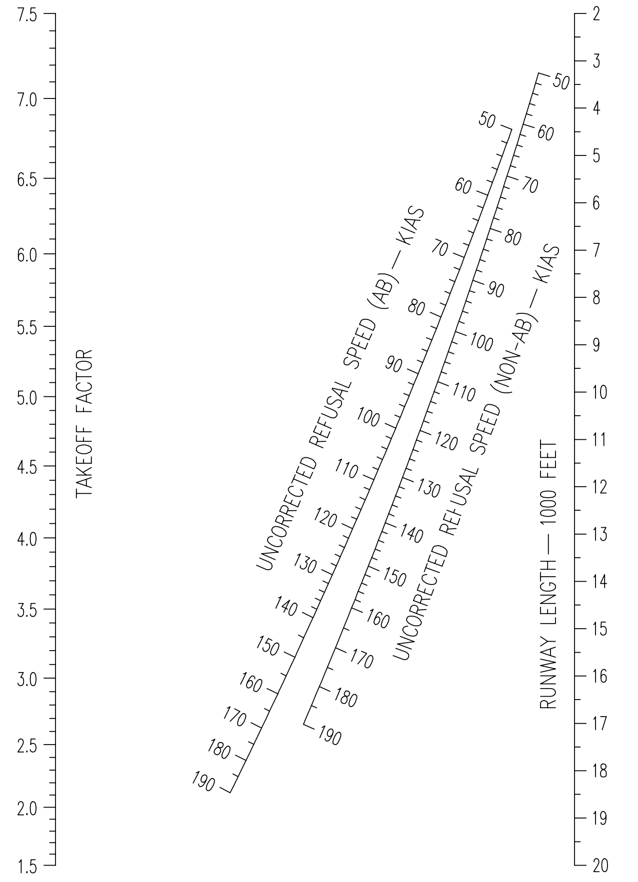


Figure P-5. (Sheet 3)

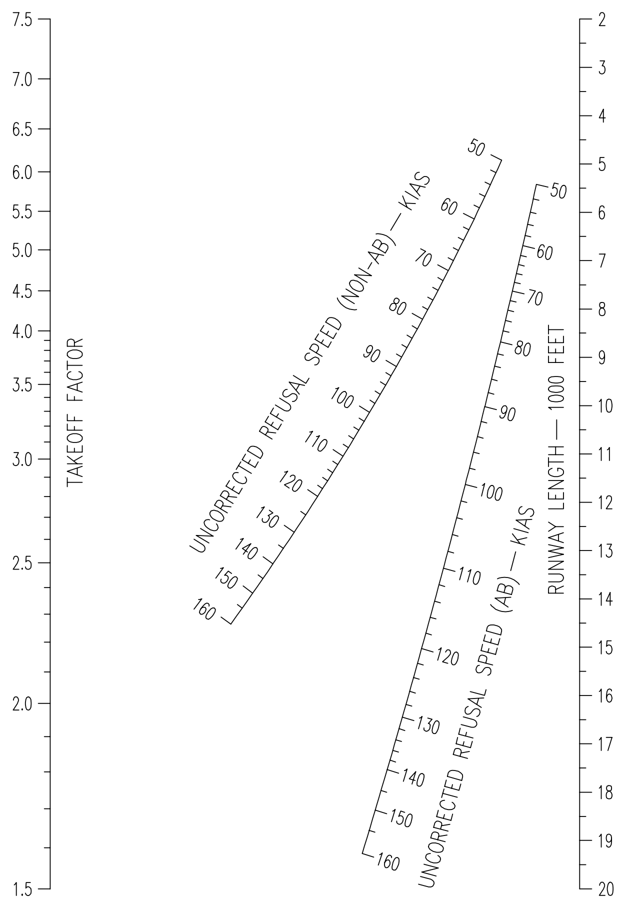
Refusal Speed

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **GW = 32,000 LB**

CONDITIONS:
- **IDLE SELECTED AT REFUSAL SPEED**
- **MAX EFFORT BRAKING**
- **ICY (RCR = 4)**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE/INCREASE REFUSAL SPEED 0.0%/0.1% WITH NON–AB AND 0.7%/0.3% WITH AB PER 1000 LB LESS/ ADDITIONAL GW.
- INCREASE/DECREASE REFUSAL SPEED 6/7 KIAS WITH NON–AB AND 7/7 KIAS WITH AB PER 5 KTS HEADWIND/TAILWIND.
- INCREASE/DECREASE REFUSAL SPEED 3/5 KIAS WITH NON–AB AND 4/6 KIAS WITH AB PER 1% UPSLOPE/ DOWNSLOPE.



1F–16CJ–1CL–1–0009A @

Figure P-5. (Sheet 4)

Refusal Speed With Drag Chute

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **DRAG CHUTE — DEPLOYED**
- **GW = 32,000 LB**

CONDITIONS:
- **IDLE SELECTED AND DRAG CHUTE DEPLOYED AT REFUSAL SPEED**
- **MAX EFFORT BRAKING**
- **DRY CONCRETE (RCR = 23)**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- FOR RCR = 16 (DRY) DECREASE NON–AB/AB DRY RUNWAY REFUSAL SPEED BY 2.5/3.5 KIAS.
- INCREASE/DECREASE REFUSAL SPEED 1.8%/1.2% WITH NON–AB AND 1.7%/1.1% WITH AB PER 1000 LB LESS/ ADDITIONAL GW.
- INCREASE/DECREASE REFUSAL SPEED 6/6 KIAS WITH NON–AB AND 7/7 KIAS WITH AB PER 5 KTS HEADWIND/TAILWIND.
- DECREASE/INCREASE REFUSAL SPEED 1/0.5 KIAS WITH NON–AB AND INCREASE/DECREASE REFUSAL SPEED 0.5/0.5 KIAS WITH AB PER 1% UPSLOPE/DOWNSLOPE.

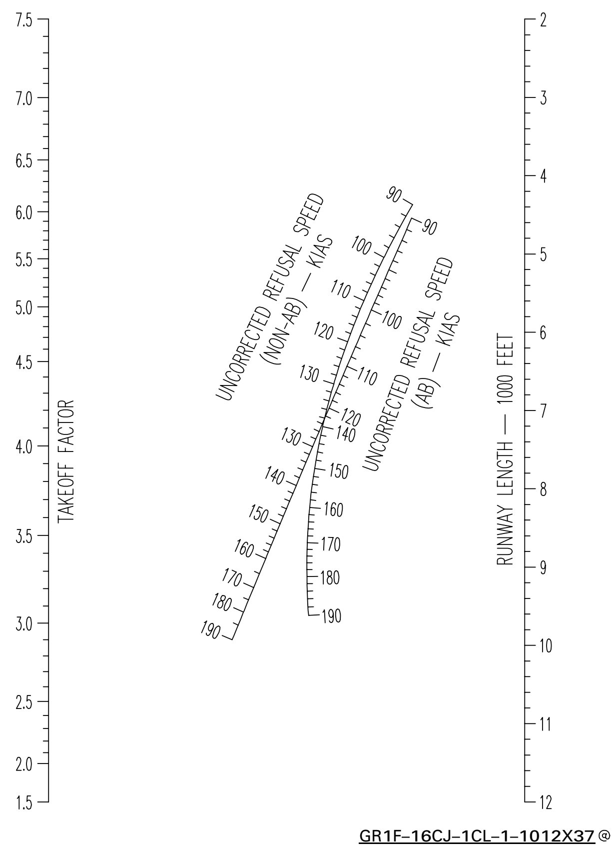


Figure P-6. (Sheet 1)

Refusal Speed With Drag Chute

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:

- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **DRAG CHUTE — DEPLOYED**
- **GW = 32,000 LB**

CONDITIONS:

- **IDLE SELECTED AND DRAG CHUTE DEPLOYED AT REFUSAL SPEED**
- **MAX EFFORT BRAKING**
- **WET CONCRETE (RCR = 18)**

NOTES:

- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- FOR RCR = 12 (WET) DECREASE NON-AB/AB WET RUNWAY REFUSAL SPEED BY 6/8 KIAS.
- INCREASE/DECREASE REFUSAL SPEED 2.1%/1.2% WITH NON–AB AND 2.1%/1.1% WITH AB PER 1000 LB LESS/ ADDITIONAL GW.
- INCREASE/DECREASE REFUSAL SPEED 7/8 KIAS WITH NON-AB AND 9/9 KIAS WITH AB PER 5 KTS HEADWIND/TAILWIND.
- INCREASE/DECREASE REFUSAL SPEED 0/0.5 KIAS WITH NON–AB AND 1.5/2 KIAS WITH AB PER 1% UPSLOPE/ DOWNSLOPE.

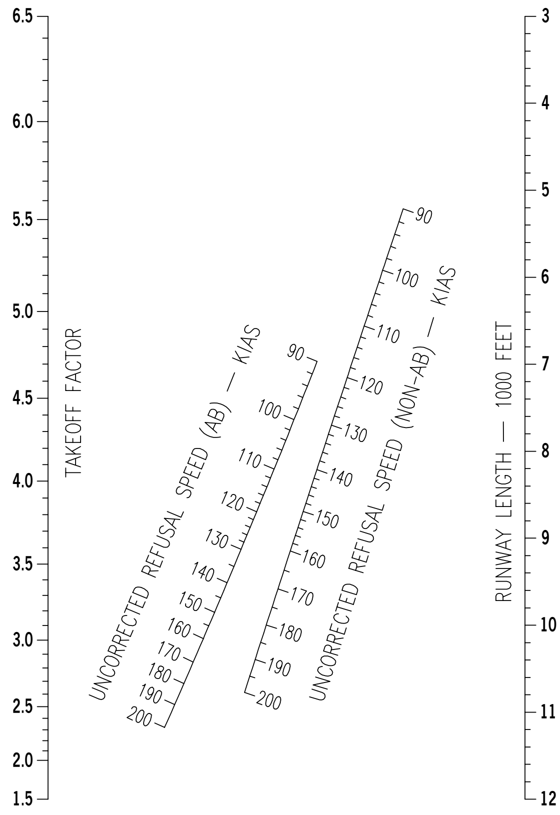


Figure P-6. (Sheet 2)

Refusal Speed With Drag Chute

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **DRAG CHUTE — DEPLOYED**
- **GW = 32,000 LB**

CONDITIONS:
- **IDLE SELECTED AND DRAG CHUTE DEPLOYED AT REFUSAL SPEED**
- **MAX EFFORT BRAKING**
- **SNOW (RCR = 8)**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- INCREASE/DECREASE REFUSAL SPEED 2.1%/1.2% WITH NON–AB AND 2.0%/1.1% WITH AB PER 1000 LB LESS/ ADDITIONAL GW.
- INCREASE/DECREASE REFUSAL SPEED 8/8 KIAS WITH NON–AB AND 9/10 KIAS WITH AB PER 5 KTS HEADWIND/TAILWIND.
- INCREASE/DECREASE REFUSAL SPEED 0.5/1.5 KIAS WITH NON–AB AND 2.5/3.5 KIAS WITH AB PER 1% UPSLOPE/ DOWNSLOPE.

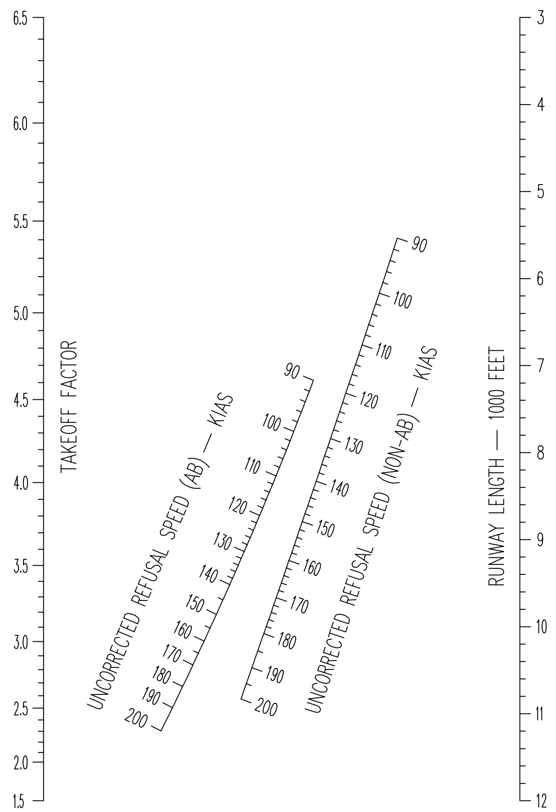


Figure P-6. (Sheet 3)

Refusal Speed With Drag Chute

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **DRAG CHUTE — DEPLOYED**
- **GW = 32,000 LB**

CONDITIONS:
- **IDLE SELECTED AND DRAG CHUTE DEPLOYED AT REFUSAL SPEED**
- **MAX EFFORT BRAKING**
- **ICY (RCR = 4)**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE/INCREASE REFUSAL SPEED 2.2%/1.2% WITH NON–AB AND 2.0%/1.0% WITH AB PER 1000 LB LESS/ ADDITIONAL GW.
- INCREASE/DECREASE REFUSAL SPEED 10/12 KIAS WITH NON-AB AND 13/14 KIAS WITH AB PER 5 KTS HEADWIND/TAILWIND.
- INCREASE/DECREASE REFUSAL SPEED 3/8.5 KIAS WITH NON–AB AND 5.5/11.5 KIAS WITH AB PER 1% UPSLOPE/ DOWNSLOPE.

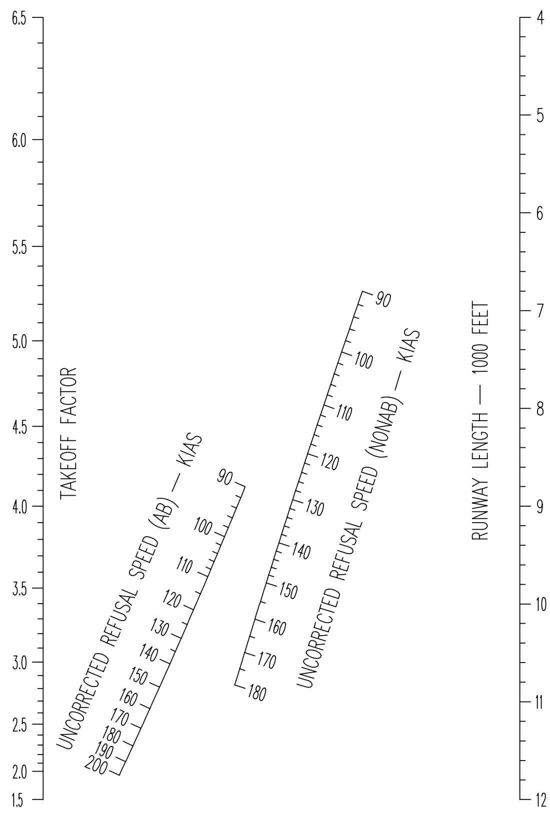


Figure P-6. (Sheet 4)

Landing Density Factor

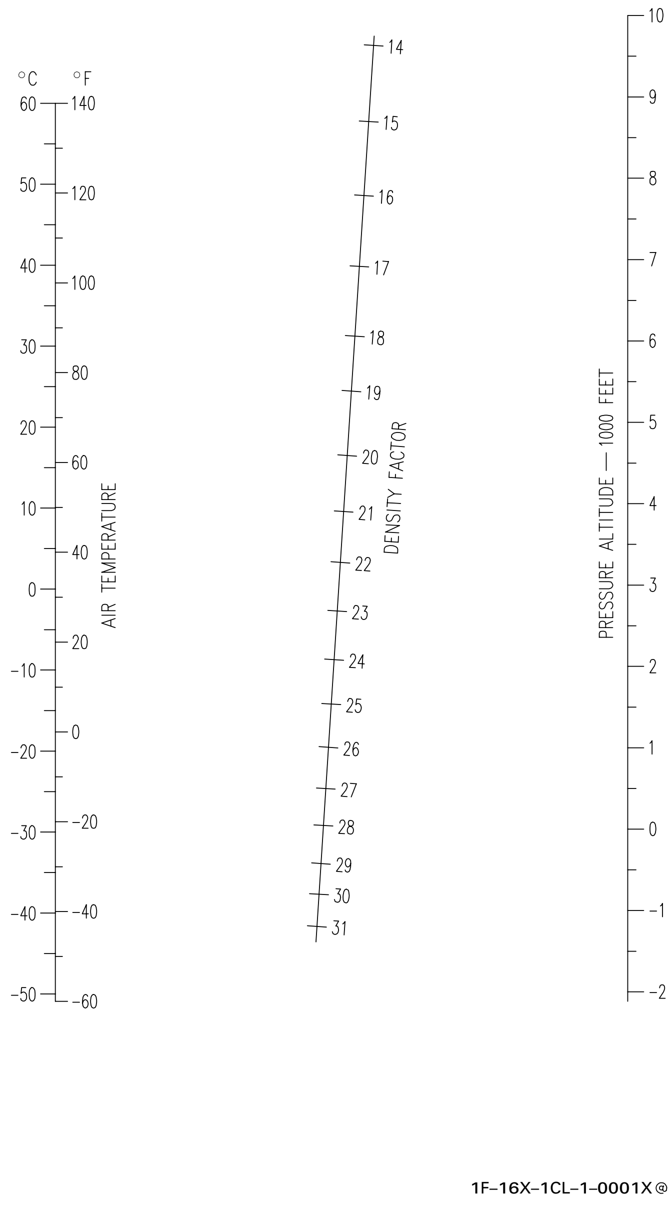


Figure P-7.

Approach Speeds

DATA BASIS ESTIMATED **ENGINE F100-PW-229**

CONFIGURATION:
- ALL DRAG INDEXES

CONDITIONS
- ALL TEMPERATURES
- ALL ALTITUDES
- 13 DEGREES AOA (INDEXER ON SPEED)

NOTE:
ACTUAL APPROACH AIRSPEED AT 11/13 DEGREES AOA MAY DIFFER BY +/-5 KNOTS DUE TO VARIATIONS IN AIRCRAFT CG.

GROSS WEIGHT (LB)	AIRSPEED (KIAS)
19,000	132
20,000	136
21,000	139
22,000	142
23,000	146
24,000	149
25,000	152
26,000	155
27,000	158
28,000	161
29,000	164
30,000	166
31,000	169
32,000	172
33,000	174
34,000	177
35,000	180
36,000	182
37,000	185
38,000	187
39,000	190
40,000	192
41,000	195
42,000	197
43,000	199
44,000	201
45,000	204
46,000	206
47,000	208
48,000	210
	NOTE: Add 8 KIAS for an 11° AOA approach

Figure P-8.

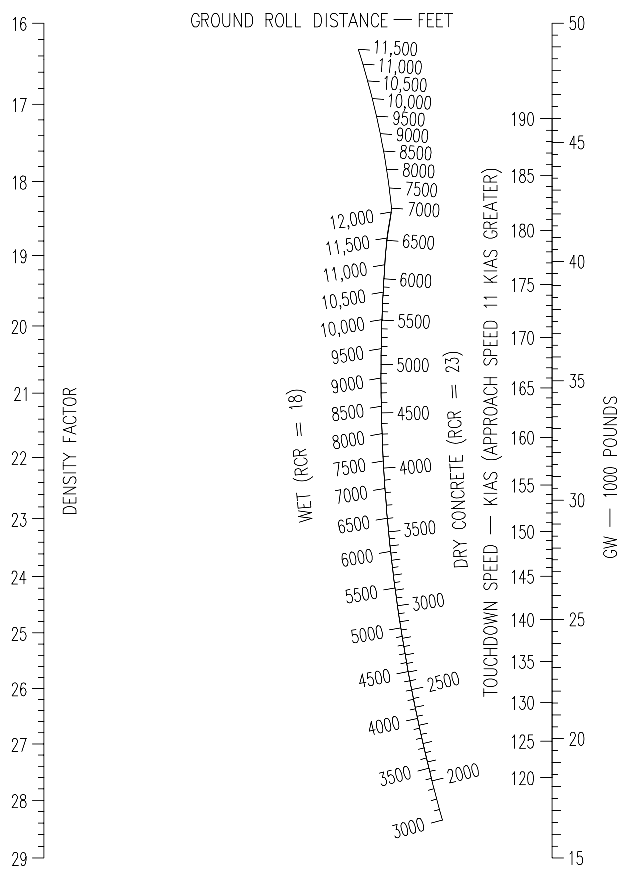
Short Field Landing Distance

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**

CONDITIONS:
- **TOUCHDOWN AT 13 DEGREES AOA**
- **ZERO WIND AND SLOPE**
- **IDLE**
- **MAX EFFORT BRAKING**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE DISTANCE 1.5% PER 1 KT HEADWIND.
- INCREASE DISTANCE 2.2% PER 1 KT TAILWIND.
- DECREASE DISTANCE 5.0% PER 1% UPSLOPE.
- INCREASE DISTANCE 7.0% PER 1% DOWNSLOPE.



1F–16CJ–1CL–1–0011A @

Figure P-9. (Sheet 1)

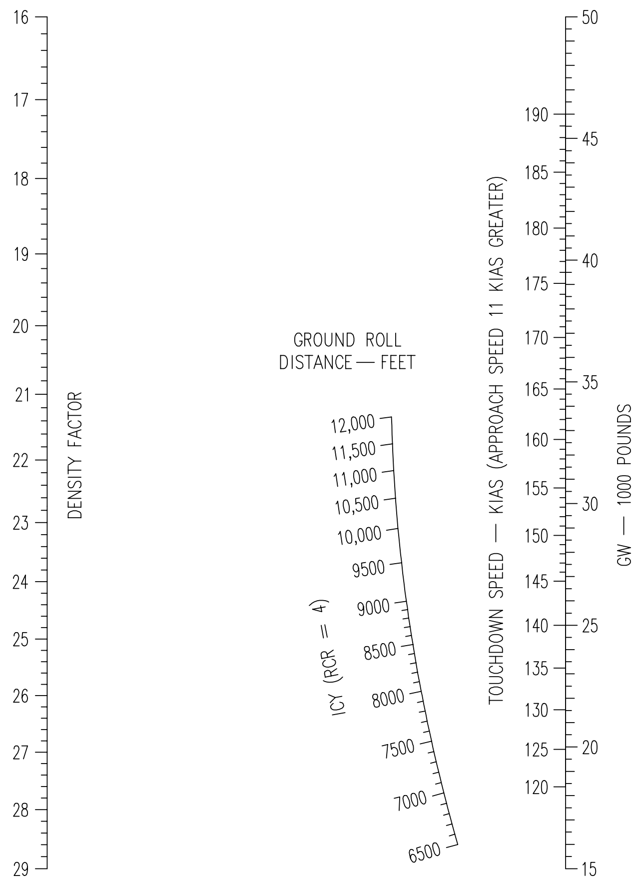
Short Field Landing Distance

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**

CONDITIONS:
- **TOUCHDOWN AT 13 DEGREES AOA**
- **ZERO WIND AND SLOPE**
- **IDLE**
- **MAX EFFORT BRAKING**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE DISTANCE 1.5% PER 1 KT HEADWIND.
- INCREASE DISTANCE 2.2% PER 1 KT TAILWIND.
- DECREASE DISTANCE 5.0% PER 1% UPSLOPE.
- INCREASE DISTANCE 7.0% PER 1% DOWNSLOPE.



1F–16CJ–1CL–1–0012A @

Figure P-9. (Sheet 2)

Short Field Landing Distance — SEC

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**

CONDITIONS:
- **TOUCHDOWN AT 13 DEGREES AOA**
- **ZERO WIND AND SLOPE**
- **IDLE**
- **MAX EFFORT BRAKING**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE DISTANCE 1.5% PER 1 KT HEADWIND.
- INCREASE DISTANCE 2.2% PER 1 KT TAILWIND.
- DECREASE DISTANCE 5.0% PER 1% UPSLOPE.
- INCREASE DISTANCE 7.0% PER 1% DOWNSLOPE.

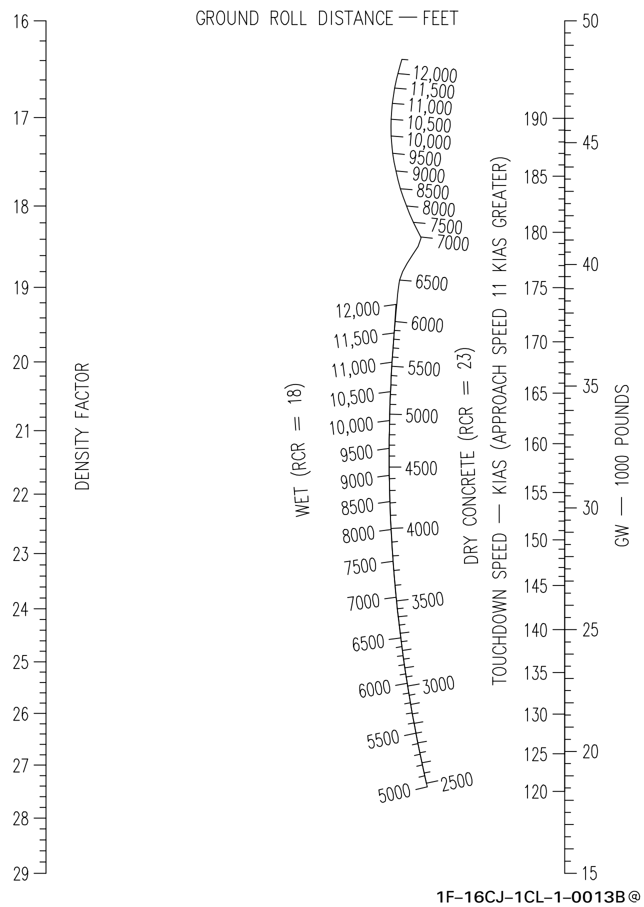


Figure P-9. (Sheet 3)

Short Field Landing Distance With Drag Chute

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:

- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **DRAG CHUTE — DEPLOYED BELOW 170 KNOTS**

CONDITIONS:

- **TOUCHDOWN AT 13 DEGREES AOA**
- **ZERO WIND AND SLOPE**
- **IDLE**
- **MAX EFFORT BRAKING**

NOTES:

- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE DISTANCE 1.5% PER 1 KT HEADWIND.
- INCREASE DISTANCE 2.2% PER 1 KT TAILWIND.
- DECREASE DISTANCE 5.0% PER 1% UPSLOPE.
- INCREASE DISTANCE 7.0% PER 1% DOWNSLOPE.

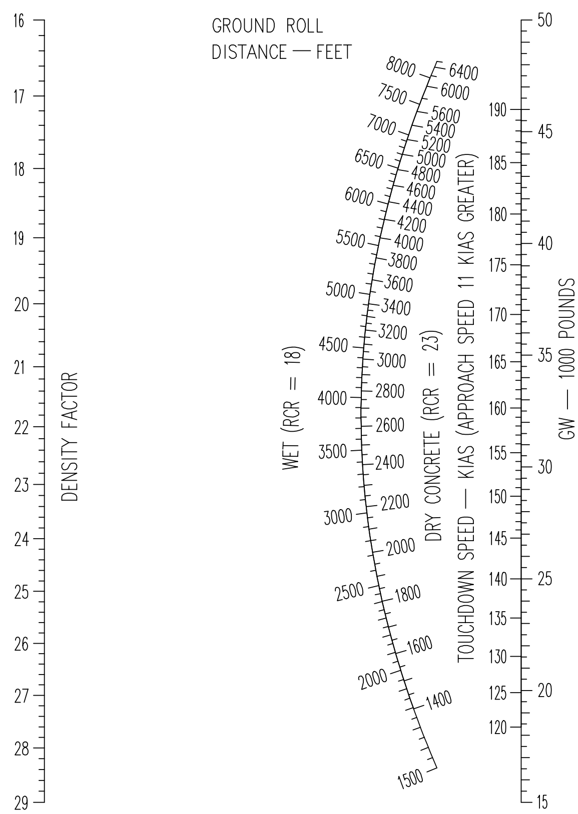


Figure P-9. (Sheet 4)

Short Field Landing Distance With Drag Chute

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:

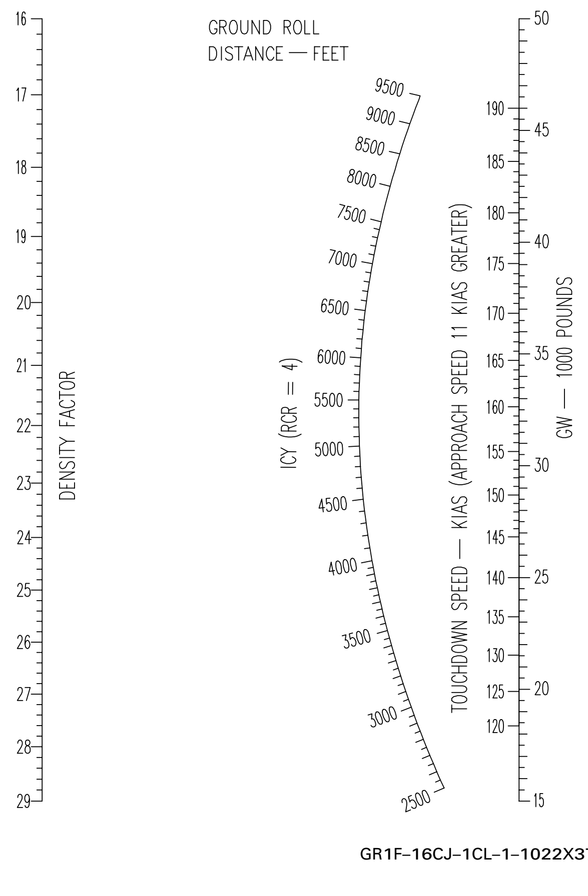
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **DRAG CHUTE — DEPLOYED BELOW 170 KNOTS**

CONDITIONS:

- **TOUCHDOWN AT 13 DEGREES AOA**
- **ZERO WIND AND SLOPE**
- **IDLE**
- **MAX EFFORT BRAKING**

NOTES:

- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE DISTANCE 1.5% PER 1 KT HEADWIND.
- INCREASE DISTANCE 2.2% PER 1 KT TAILWIND.
- DECREASE DISTANCE 5.0% PER 1% UPSLOPE.
- INCREASE DISTANCE 7.0% PER 1% DOWNSLOPE.



GR1F–16CJ–1CL–1–1022X37@

Figure P-9. (Sheet 5)

Short Field Landing Distance — SEC With Drag Chute

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **DRAG CHUTE — DEPLOYED BELOW 170 KNOTS**

CONDITIONS:
- **TOUCHDOWN AT 13 DEGREES AOA**
- **ZERO WIND AND SLOPE**
- **IDLE**
- **MAX EFFORT BRAKING**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE DISTANCE 1.5% PER 1 KT HEADWIND.
- INCREASE DISTANCE 2.2% PER 1 KT TAILWIND.
- DECREASE DISTANCE 5.0% PER 1% UPSLOPE.
- INCREASE DISTANCE 7.0% PER 1% DOWNSLOPE.

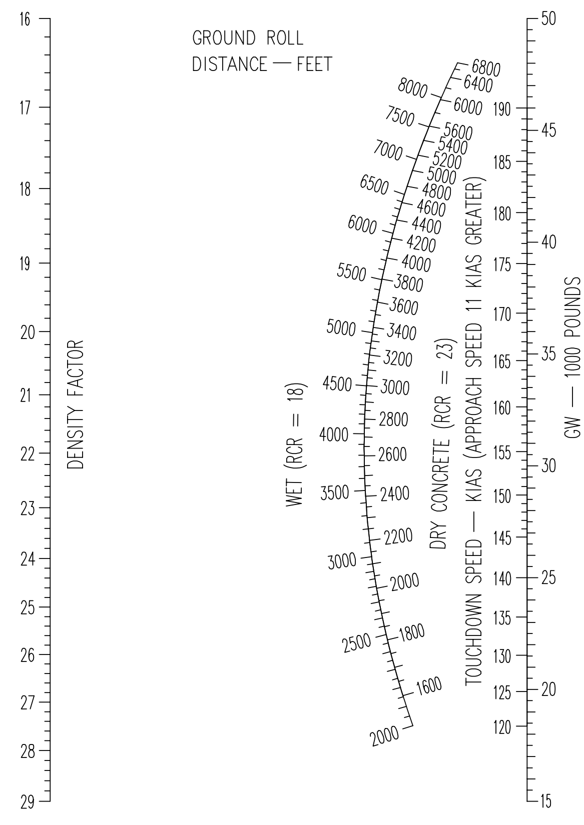


Figure P-9. (Sheet 6)

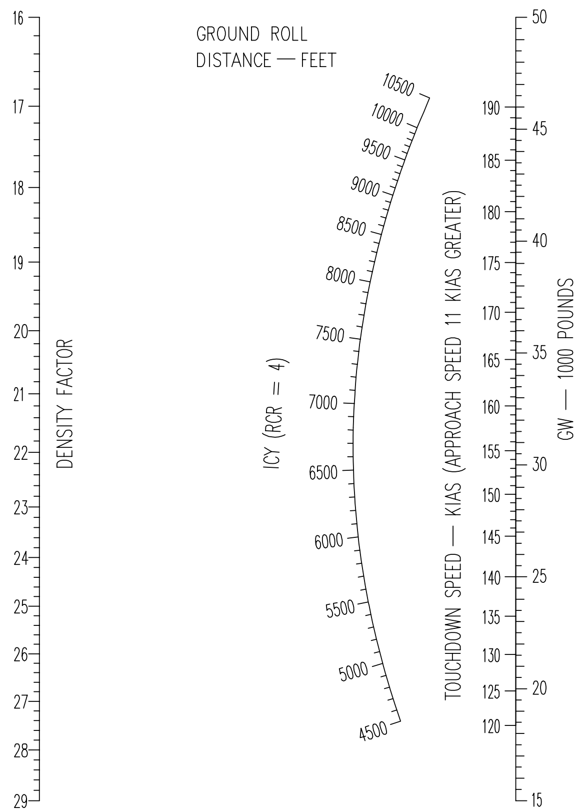
Short Field Landing Distance — SEC With Drag Chute

DATA BASIS ESTIMATED **ENGINE F100-PW-229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **DRAG CHUTE — DEPLOYED BELOW 170 KNOTS**

CONDITIONS:
- **TOUCHDOWN AT 13 DEGREES AOA**
- **ZERO WIND AND SLOPE**
- **IDLE**
- **MAX EFFORT BRAKING**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE DISTANCE 1.5% PER 1 KT HEADWIND.
- INCREASE DISTANCE 2.2% PER 1 KT TAILWIND.
- DECREASE DISTANCE 5.0% PER 1% UPSLOPE.
- INCREASE DISTANCE 7.0% PER 1% DOWNSLOPE.



GR1F-16CJ-1CL-1-1024X37@

Figure P-9. (Sheet 7)

Climb/Optimum Cruise — Drag Index = 0

DATA BASIS FLIGHT TEST **ENGINE F100-PW-229**
FUEL JP-8

NOTES:
- STD DAY/FULLY SERVICED FUEL = 7162 LB.
- 800-LB FUEL ALLOWANCE FOR GROUND OPERATION AND TAKEOFF/ACCELERATION TO MIL CLIMB AIRSPEED (ASSUME 30-MIN GROUND TIME).
- CLIMB AT KIAS/MACH NO., WHICHEVER IS SLOWER.

MIL CLIMB					OPTIMUM CRUISE	
					AT LEVEL OFF	
ALT 1000 FEET	CLIMB @ KIAS / MACH	TIME (MIN)	DIST (NM)	FUEL REMAINING AT LEVEL OFF (LB)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)
50	---	---	---	---	---	---
45	445 / 0.87	7.6	63.4	5584	0.87/238/502	2622
40	445 / 0.87	4.5	37.4	5764	0.87/268/502	2454
35	445 / 0.81	3.2	25.3	5880	0.81/275/466	2327
30	445 / 0.80	2.4	18.4	5957	0.80/304/471	2541
25	445 / 0.73	1.8	13.0	6038	0.73/308/442	2655
20	445 / 0.70	1.3	8.8	6112	0.70/323/430	2889
10	0.59	0.6	3.4	6231	0.59/325/374	3171
0	0.49	0.0	0.0	6362	0.49/326/326	3488

OPTIMUM CRUISE						
	5000 LB REMAINING		3000 LB REMAINING		2000 LB REMAINING	
ALT 1000 FEET	MACH/KIAS/ KTAS	TOTAL FUEL FLOW (LB/HR)	MACH/KIAS/ KTAS	TOTAL FUEL FLOW (LB/HR)	MACH/KIAS/ KTAS	TOTAL FUEL FLOW (LB/HR)
50	---	---	---	---	---	---
45	0.87/238/502	2540	0.85/231/488	2232	0.85/231/488	2128
40	0.87/268/501	2384	0.84/256/482	2139	0.84/256/482	2069
35	0.80/272/461	2249	0.80/272/461	2127	0.80/272/461	2070
30	0.80/304/471	2496	0.76/289/450	2303	0.75/283/442	2220
25	0.72/301/433	2560	0.70/293/421	2408	0.70/293/421	2369
20	0.69/318/423	2804	0.66/304/405	2609	0.64/297/396	2514
10	0.57/316/363	3040	0.54/301/346	2824	0.53/293/338	2715
0	0.48/316/316	3338	0.46/302/302	3118	0.45/295/295	3008

Figure P-10. (Sheet 1)

Climb/Optimum Cruise — Drag Index = 22

DATA BASIS FLIGHT TEST **ENGINE F100-PW-229**
FUEL JP-8

NOTES:
- STD DAY/FULLY SERVICED FUEL = 7162 LB + 2040 LB= 9202 LB.
- 800-LB FUEL ALLOWANCE FOR GROUND OPERATION AND TAKEOFF/ACCELERATION TO MIL CLIMB AIRSPEED (ASSUME 30-MIN GROUND TIME).
- CLIMB AT KIAS/MACH NO., WHICHEVER IS SLOWER.

MIL CLIMB					OPTIMUM CRUISE	
					AT LEVEL OFF	
ALT 1000 FEET	CLIMB @ KIAS/MACH	TIME (MIN)	DIST (NM)	FUEL REMAINING AT LEVEL OFF (LB)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)
45	– – –	– – –	– – –	– – –	– – –	– – –
40	436/0.85	5.8	47.2	7677	0.85/259/488	2750
35	436/0.83	3.8	30.9	7821	0.83/282/476	2668
30	436/0.80	2.8	22.1	7924	0.80/304/471	2823
25	436/0.74	2.1	15.6	8019	0.74/312/447	2947
20	436/0.70	1.5	10.5	8108	0.70/324/430	3126
10	0.60	0.7	3.9	8255	0.60/332/382	3477
0	0.50	0.0	0.0	8402	0.50/330/330	3776

OPTIMUM CRUISE						
	5000 LB REMAINING		3000 LB REMAINING		2000 LB REMAINING	
ALT 1000 FEET	MACH/KIAS/ KTAS	TOTAL FUEL FLOW (LB/HR)	MACH/KIAS/ KTAS	TOTAL FUEL FLOW (LB/HR)	MACH/KIAS/ KTAS	TOTAL FUEL FLOW (LB/HR)
45	– – –	– – –	– – –	– – –	– – –	– – –
40	0.85/259/486	2488	0.84/256/482	2291	0.84/256/482	2214
35	0.80/272/461	2393	0.80/272/461	2269	0.80/272/461	2210
30	0.78/295/459	2591	0.75/283/442	2389	0.75/283/442	2343
25	0.70/293/421	2625	0.70/293/421	2536	0.70/293/421	2495
20	0.67/311/414	2892	0.65/297/397	2691	0.63/291/388	2594
10	0.56/309/356	3120	0.53/295/340	2904	0.52/288/331	2789
0	0.47/310/310	3421	0.45/297/297	3197	0.44/289/289	3081

Figure P-10. (Sheet 2)

Climb/Optimum Cruise — Drag Index = 53

DATA BASIS FLIGHT TEST **ENGINE F100-PW-229**
FUEL JP-8

NOTES:
- STD DAY/FULLY SERVICED FUEL = 7162 LB + 5032 LB= 12,194 LB.
- 800-LB FUEL ALLOWANCE FOR GROUND OPERATION AND TAKEOFF/ACCELERATION TO MIL CLIMB AIRSPEED (ASSUME 30-MIN GROUND TIME).
- CLIMB AT KIAS/MACH NO., WHICHEVER IS SLOWER.

MIL CLIMB					OPTIMUM CRUISE	
					AT LEVEL OFF	
ALT 1000 FEET	CLIMB @ KIAS/MACH	TIME (MIN)	DIST (NM)	FUEL REMAINING AT LEVEL OFF (LB)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)
45	---	---	---	---	---	---
40	424/0.85	9.1	74.1	10,363	0.85/259/488	3322
35	424/0.84	5.0	40.7	10,650	0.84/287/484	3170
30	424/0.80	3.6	27.9	10,798	0.80/304/471	3229
25	424/0.75	2.6	19.4	10,921	0.75/315/451	3361
20	424/0.70	1.8	13.0	11,034	0.70/324/430	3482
10	0.60	0.8	4.7	11,222	0.60/333/383	3822
0	0.50	0.0	0.0	11,394	0.50/331/331	4116

OPTIMUM CRUISE						
	8000 LB REMAINING		5000 LB REMAINING		2000 LB REMAINING	
ALT 1000 FEET	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)
45	---	---	---	---	---	---
40	0.85/259/488	3012	0.84/256/482	2655	0.84/256/482	2395
35	0.82/281/475	2891	0.80/272/461	2577	0.78/265/451	2335
30	0.80/304/471	3051	0.76/286/446	2718	0.73/276/431	2460
25	0.72/302/434	3070	0.70/293/421	2815	0.69/288/415	2624
20	0.70/323/429	3322	0.65/301/402	2982	0.61/282/377	2677
10	0.57/319/367	3532	0.54/299/345	3193	0.50/279/322	2858
0	0.48/318/318	3814	0.45/301/301	3493	0.43/282/282	3161

Figure P-10. (Sheet 3)

Climb/Optimum Cruise — Drag Index = 79

DATA BASIS FLIGHT TEST **ENGINE F100-PW-229**
FUEL JP-8

NOTES:
- STD DAY/FULLY SERVICED FUEL = 7162 LB + 5032 LB + 2040 LB = 14,234 LB.
- 1400-LB FUEL ALLOWANCE FOR GROUND OPERATION AND MAX AB TAKEOFF/ACCELERATION TO MIL CLIMB AIRSPEED (ASSUME 30-MIN GROUND TIME).
- TAKEOFF AND CLIMB TO MIL CLIMB AIRSPEED WITH MAX AB.
- CLIMB AT KIAS/MACH NO., WHICHEVER IS SLOWER.

MIL CLIMB					OPTIMUM CRUISE	
					AT LEVEL OFF	
ALT 1000 FEET	CLIMB @ KIAS/MACH	TIME (MIN)	DIST (NM)	FUEL REMAINING AT LEVEL OFF (LB)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)
40	---	---	---	---	---	---
35	411/0.84	6.2	50.3	11,938	0.84/287/484	3518
30	411/0.80	4.2	32.9	12,138	0.80/304/471	3550
25	411/0.75	3.0	22.5	12,287	0.75/315/451	3670
20	411/0.70	2.1	15.0	12,420	0.70/324/430	3771
10	0.60	0.9	5.3	12,644	0.60/333/383	4075
0	0.51	0.0	0.0	12,834	0.51/334/334	4412

OPTIMUM CRUISE						
	9000 LB REMAINING		5000 LB REMAINING		2000 LB REMAINING	
ALT 1000 FEET	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)
40	---	---	---	---	---	---
35	0.84/285/482	3221	0.80/272/461	2757	0.77/262/446	2464
30	0.80/303/471	3321	0.75/283/442	2867	0.72/271/425	2582
25	0.71/299/430	3287	0.70/293/421	2987	0.68/283/409	2747
20	0.68/315/419	3484	0.64/293/391	3057	0.61/279/374	2787
10	0.58/319/367	3751	0.54/297/342	3323	0.50/279/322	2998
0	0.48/318/318	4035	0.45/296/296	3590	0.42/278/278	3253

Figure P-10. (Sheet 4)

Diversion Decision — Divert

DATA BASIS FLIGHT TEST **ENGINE F100-PW-229**

CONDITIONS:

- **MIL CLIMB AT 423 KIAS OR OPTIMUM ALTITUDE MACH NO., WHICHEVER IS LESS**
- **DESCEND AT IDLE, 221 KIAS**
- **STANDARD DAY**
- **NO FUEL RESERVE**
- **ZERO WIND**
- **ALL DESCENTS ARE TO SEA LEVEL**
- **DRAG INDEX = 55**

NOTES:

- 4.0% RANGE GAIN FOR 10 KTS TAILWIND.
- 2.5% RANGE LOSS FOR 10 KTS HEADWIND.
- SUBTRACT 2.5 NM FROM DESCENT DISTANCE FOR EACH 1000 FT OF DESTINATION ELEVATION.
- TOTAL DIVERT RANGE AT CURRENT ALTITUDE INCLUDES CRUISE AND DESCENT, AND TOTAL DIVERT RANGE AT OPTIMUM ALTITUDE INCLUDES CLIMB, CRUISE, AND DESCENT.

IF YOU ARE AT SEA LEVEL

FUEL ON BOARD –LB	REMAIN AT SEA LEVEL		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL DIVERT RANGE–NM		ALT/MACH	TOTAL DIVERT RANGE–NM	FROM OPT ALT –NM	FUEL USED IN DESCENT –LB
200	19		5.0K/0.45	20	16	104
400	37		15.0K/0.54	46	39	204
600	55		25.0K/0.69	78	62	275
800	73	0.42M	30.0K/0.71	113	72	306
1000	91		35.0K/0.76	151	85	338
1500	136		40.0K/0.82	250	99	376
2000	180		40.0K/0.83	349	99	376

IF YOU ARE AT 5000 FEET

FUEL ON BOARD –LB	REMAIN AT 5000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL DIVERT RANGE–NM*		ALT/MACH	TOTAL DIVERT RANGE–NM	FROM OPT ALT –NM	FUEL USED IN DESCENT –LB
200	26		5.0K/0.45	26	16	104
400	46		15.0K/0.54	52	39	204
600	66		30.0K/0.72	88	72	306
800	87	0.46M	35.0K/0.76	124	85	338
1000	107		35.0K/0.77	163	85	338
1500	157		40.0K/0.83	263	99	376
2000	207		40.0K/0.84	362	99	376

***START DESCENT AT 16 NM. 104 LB FUEL USED IN DESCENT.**

Figure P-11. (Sheet 1)

Diversion Decision — Divert

DATA BASIS FLIGHT TEST **ENGINE F100-PW-229**

CONDITIONS:

- **MIL CLIMB AT 423 KIAS OR OPTIMUM ALTITUDE MACH NO., WHICHEVER IS LESS**
- **DESCEND AT IDLE, 221 KIAS**
- **STANDARD DAY**
- **NO FUEL RESERVE**
- **ZERO WIND**
- **ALL DESCENTS ARE TO SEA LEVEL**
- **DRAG INDEX = 55**

NOTES:

- 4.0% RANGE GAIN FOR 10 KTS TAILWIND.
- 2.5% RANGE LOSS FOR 10 KTS HEADWIND.
- SUBTRACT 2.5 NM FROM DESCENT DISTANCE FOR EACH 1000 FT OF DESTINATION ELEVATION.
- TOTAL DIVERT RANGE AT CURRENT ALTITUDE INCLUDES CRUISE AND DESCENT, AND TOTAL DIVERT RANGE AT OPTIMUM ALTITUDE INCLUDES CLIMB, CRUISE, AND DESCENT.

IF YOU ARE AT 10,000 FEET

FUEL ON BOARD –LB	REMAIN AT 10,000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL DIVERT RANGE–NM*		ALT/MACH	TOTAL DIVERT RANGE–NM	FROM OPT ALT –NM	FUEL USED IN DESCENT –LB
200	32		10.0K/0.50	32	28	164
400	55		20.0K/0.60	60	49	239
600	78		30.0K/0.71	97	72	306
800	101	0.50M	35.0K/0.76	136	85	338
1000	123		35.0K/0.77	175	85	338
1500	180		40.0K/0.83	275	99	376
2000	236		40.0K/0.84	374	99	376

***START DESCENT AT 28 NM. 164 LB FUEL USED IN DESCENT.**

IF YOU ARE AT 20,000 FEET

FUEL ON BOARD –LB	REMAIN AT 20,000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL DIVERT RANGE–NM*		ALT/MACH	TOTAL DIVERT RANGE–NM	FROM OPT ALT –NM	FUEL USED IN DESCENT –LB
200	- - -		- - -	- - -	- - -	- - -
400	72		25.0K/0.70	76	62	275
600	101		35.0K/0.76	114	85	338
800	130	0.61M	40.0K/0.82	155	99	376
1000	158		40.0K/0.82	196	99	376
1500	229		40.0K/0.83	298	99	376
2000	299		40.0K/0.84	397	99	376

***START DESCENT AT 49 NM. 239 LB FUEL USED IN DESCENT.**

Figure P-11. (Sheet 2)

Diversion Decision — Divert

DATA BASIS FLIGHT TEST **ENGINE F100-PW-229**

CONDITIONS:

- MIL CLIMB AT 423 KIAS OR OPTIMUM ALTITUDE MACH NO., WHICHEVER IS LESS
- DESCEND AT IDLE, 221 KIAS
- STANDARD DAY
- NO FUEL RESERVE
- ZERO WIND
- ALL DESCENTS ARE TO SEA LEVEL
- DRAG INDEX = 55

NOTES:

- 4.0% RANGE GAIN FOR 10 KTS TAILWIND.
- 2.5% RANGE LOSS FOR 10 KTS HEADWIND.
- SUBTRACT 2.5 NM FROM DESCENT DISTANCE FOR EACH 1000 FT OF DESTINATION ELEVATION.
- TOTAL DIVERT RANGE AT CURRENT ALTITUDE INCLUDES CRUISE AND DESCENT, AND TOTAL DIVERT RANGE AT OPTIMUM ALTITUDE INCLUDES CLIMB, CRUISE, AND DESCENT.

IF YOU ARE AT 30,000 FEET

FUEL ON BOARD −LB	REMAIN AT 30,000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL DIVERT RANGE−NM*		ALT/MACH	TOTAL DIVERT RANGE−NM	FROM OPT ALT −NM	FUEL USED IN DESCENT −LB
200	- - -		- - -	- - -	- - -	- - -
400	89		30.0K/0.71	89	72	306
600	125		40.0K/0.82	131	99	376
800	161	0.72M	40.0K/0.82	172	99	376
1000	196		40.0K/0.82	213	99	376
1500	284		40.0K/0.83	314	99	376
2000	371		40.0K/0.84	414	99	376

***START DESCENT AT 72 NM. 306 LB FUEL USED IN DESCENT.**

IF YOU ARE AT 40,000 FEET

FUEL ON BOARD −LB	REMAIN AT 40,000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL DIVERT RANGE−NM*		ALT/MACH	TOTAL DIVERT RANGE−NM	FROM OPT ALT −NM	FUEL USED IN DESCENT −LB
200	- - -		- - -	- - -	- - -	- - -
400	104		40.0K/0.82	104	99	376
600	146		40.0K/0.82	146	99	376
800	187	0.83M	40.0K/0.82	187	99	376
1000	228		40.0K/0.83	228	99	376
1500	330		40.0K/0.84	330	99	376
2000	429		40.0K/0.84	429	99	376

***START DESCENT AT 99 NM. 376 LB FUEL USED IN DESCENT.**

Figure P-11. (Sheet 3)

Diversion Decision — Loiter

DATA BASIS FLIGHT TEST **ENGINE F100-PW-229**

CONDITIONS:

- **MIL CLIMB AT 423 KIAS OR OPTIMUM ALTITUDE MACH NO., WHICHEVER IS LESS**
- **DESCEND AT IDLE, 221 KIAS**
- **STANDARD DAY**
- **NO FUEL RESERVE**
- **ZERO WIND**
- **ALL DESCENTS ARE TO SEA LEVEL**
- **DRAG INDEX = 55**

NOTES:

- LOITER TIME AT CONSTANT ALTITUDE BASED ON 10 NM HOLDING PATTERN WITH 30-DEGREE BANK TURNS.
- ADD 0.5 MIN TO LOITER TIME FOR EACH 1000 FT OF DESTINATION ELEVATION.
- SUBTRACT 2.3 NM FROM DESCENT DISTANCE FOR EACH 1000 FT OF DESTINATION ELEVATION.
- TOTAL LOITER TIME AT CURRENT ALTITUDE INCLUDES LOITER AND DESCENT, AND TOTAL TIME AT OPTIMUM ALTITUDE INCLUDES CLIMB, LOITER, AND DESCENT.

IF YOU ARE AT SEA LEVEL

FUEL ON BOARD −LB	REMAIN AT SEA LEVEL		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL LOITER TIME−MIN		ALT/MACH	TOTAL TIME−MIN	FROM OPT ALT −NM	FUEL USED IN DESCENT −LB
200	- - -		- - -	- - -	- - -	- - -
400	9		0.0K/0.31	9	0	0
600	13		5.0K/0.34	14	13	87
800	18	0.32M	20.0K/0.46	20	45	228
1000	22		30.0K/0.56	26	67	292
1500	32		35.0K/0.66	40	80	327
2000	42		35.0K/0.66	52	80	327

IF YOU ARE 5000 FEET

FUEL ON BOARD −LB	REMAIN AT 5000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL LOITER TIME−MIN*		ALT/MACH	TOTAL TIME−MIN	FROM OPT ALT −NM	FUEL USED IN DESCENT −LB
200	- - -		- - -	- - -	- - -	- - -
400	- - -		- - -	- - -	- - -	- - -
600	15		10.0K/0.38	16	24	149
800	20	0.35M	25.0K/0.50	22	56	260
1000	24		35.0K/0.66	28	80	327
1500	35		35.0K/0.66	41	80	327
2000	45		35.0K/0.66	53	80	327

*** START DESCENT AT 13 NM. 87 LB FUEL USED IN DESCENT.**

Figure P-12. (Sheet 1)

Diversion Decision — Loiter

DATA BASIS FLIGHT TEST **ENGINE F100-PW-229**

CONDITIONS:

- **MIL CLIMB AT 423 KIAS OR OPTIMUM ALTITUDE MACH NO., WHICHEVER IS LESS**
- **DESCEND AT IDLE, 221 KIAS**
- **STANDARD DAY**
- **NO FUEL RESERVE**
- **ZERO WIND**
- **ALL DESCENTS ARE TO SEA LEVEL**
- **DRAG INDEX = 55**

NOTES:

- LOITER TIME AT CONSTANT ALTITUDE BASED ON 10 NM HOLDING PATTERN WITH 30-DEGREE BANK TURNS.
- ADD 0.5 MIN TO LOITER TIME FOR EACH 1000 FT OF DESTINATION ELEVATION.
- SUBTRACT 2.3 NM FROM DESCENT DISTANCE FOR EACH 1000 FT OF DESTINATION ELEVATION.
- TOTAL LOITER TIME AT CURRENT ALTITUDE INCLUDES LOITER AND DESCENT, AND TOTAL TIME AT OPTIMUM ALTITUDE INCLUDES CLIMB, LOITER, AND DESCENT.

IF YOU ARE AT 10,000 FEET

FUEL ON BOARD –LB	REMAIN AT 10,000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL LOITER TIME–MIN*		ALT/MACH	TOTAL TIME–MIN	FROM OPT ALT –NM	FUEL USED IN DESCENT –LB
200	- - -		- - -	- - -	- - -	- - -
400	- - -		- - -	- - -	- - -	- - -
600	17		15.0K/0.42	17	35	193
800	22	0.38M	25.0K/0.50	23	56	260
1000	26		35.0K/0.66	29	80	327
1500	38		35.0K/0.66	42	80	327
2000	48		35.0K/0.66	54	80	327

*** START DESCENT AT 25 NM. 150 LB FUEL USED IN DESCENT.**

IF YOU ARE AT 20,000 FEET

FUEL ON BOARD –LB	REMAIN AT 20,000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL LOITER TIME–MIN*		ALT/MACH	TOTAL TIME–MIN	FROM OPT ALT –NM	FUEL USED IN DESCENT –LB
200	- - -		- - -	- - -	- - -	- - -
400	- - -		- - -	- - -	- - -	- - -
600	20		25.0K/0.50	21	56	260
800	25	0.47M	35.0K/0.66	26	80	327
1000	30		35.0K/0.66	32	80	327
1500	42		35.0K/0.66	44	80	327
2000	53		35.0K/0.66	56	80	327

*** START DESCENT AT 46 NM. 229 LB FUEL USED IN DESCENT.**

Figure P-12. (Sheet 2)

Diversion Decision — Loiter

DATA BASIS FLIGHT TEST **ENGINE F100-PW-229**

CONDITIONS:

- **MIL CLIMB AT 423 KIAS OR OPTIMUM ALTITUDE MACH NO., WHICHEVER IS LESS**
- **DESCEND AT IDLE, 221 KIAS**
- **STANDARD DAY**
- **NO FUEL RESERVE**
- **ZERO WIND**
- **ALL DESCENTS ARE TO SEA LEVEL**
- **DRAG INDEX = 55**

NOTES:

- LOITER TIME AT CONSTANT ALTITUDE BASED ON 10 NM HOLDING PATTERN WITH 30-DEGREE BANK TURNS.
- ADD 0.5 MIN TO LOITER TIME FOR EACH 1000 FT OF DESTINATION ELEVATION.
- SUBTRACT 2.3 NM FROM DESCENT DISTANCE FOR EACH 1000 FT OF DESTINATION ELEVATION.
- TOTAL LOITER TIME AT CURRENT ALTITUDE INCLUDES LOITER AND DESCENT, AND TOTAL TIME AT OPTIMUM ALTITUDE INCLUDES CLIMB, LOITER, AND DESCENT.

IF YOU ARE AT 30,000 FEET

FUEL ON BOARD —LB	REMAIN AT 30,000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL LOITER TIME—MIN*		ALT/MACH	TOTAL TIME—MIN	FROM OPT ALT —NM	FUEL USED IN DESCENT —LB
200	- - -		- - -	- - -	- - -	- - -
400	- - -		- - -	- - -	- - -	- - -
600	23		30.0K/0.56	23	67	292
800	28	0.57M	35.0K/0.66	29	80	327
1000	34		35.0K/0.66	34	80	327
1500	46		35.0K/0.66	46	80	327
2000	58		35.0K/0.66	58	80	327

*** START DESCENT AT 67 NM. 292 LB FUEL USED IN DESCENT.**

IF YOU ARE AT 40,000 FEET

FUEL ON BOARD —LB	REMAIN AT 40,000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL LOITER TIME—MIN*		ALT/MACH	TOTAL TIME—MIN	FROM OPT ALT —NM	FUEL USED IN DESCENT —LB
200	- - -		- - -	- - -	- - -	- - -
400	- - -		- - -	- - -	- - -	- - -
600	- - -		- - -	- - -	- - -	- - -
800	30	0.73M	40.0K/0.73	30	95	365
1000	35		40.0K/0.73	35	95	365
1500	47		40.0K/0.73	47	95	365
2000	58		40.0K/0.73	58	95	365

*** START DESCENT AT 95 NM. 365 LB FUEL USED IN DESCENT.**

Figure P-12. (Sheet 3)

Best Cruise Altitude for Short Range Mission — Maximum Range Descent

DATA BASIS FLIGHT TEST **ENGINE F100-PW-229**

CONDITIONS:

- STANDARD DAY
- NO WIND
- MIL CLIMB AT SCHEDULED KIAS OR CONSTANT ALTITUDE OPTIMUM CRUISE MACH NO., WHICHEVER IS LOWER
- CRUISE AT CONSTANT ALTITUDE AT OPTIMUM MACH
- DESCEND AT IDLE WITH SPEEDBRAKES CLOSED
- DRAG INDEX/DESCENT SPEED KIAS = 0/215, 50/220, AND ≥ 100/230

ST CL GW*	TOT MSN RG**	BEST CR ALT	TOTAL FUEL CONSUMED (LB)/DESCENT RANGE (NM)		
LB– 1000	NM	FT– 1000	DI 0	DI 100	DI 200
20.0	50	14.4	400/46	448/32	503/25
20.0	100	30.1	669/88	733/62	831/49
20.0	150	40.1	899/125	993/86	1140/68
20.0	200	41.8	1099/134	1236/91	1166/70
20.0	250	41.9	1292/136	1471/91	1321/71
24.0	50	15.6	414/45	463/35	528/28
24.0	100	29.5	717/79	803/62	918/51
24.0	150	34.4	966/93	1098/73	1276/60
24.0	200	36.5	1195/99	1378/77	1591/64
24.0	250	37.8	1423/105	1652/81	1895/66
28.0	50	16.8	431/43	488/36	561/30
28.0	100	27.2	775/66	880/56	1012/47
28.0	150	32.5	1054/77	1220/67	1416/57
28.0	200	35.0	1317/84	1533/72	1793/62
28.0	250	35.7	1566/86	1842/74	2159/63
32.0	50	15.4	462/36	530/32	609/28
32.0	100	24.9	839/54	961/49	1112/43
32.0	150	30.1	1151/64	1346/60	1564/52
32.0	200	32.9	1447/70	1694/65	1996/57
32.0	250	34.0	1733/73	2042/67	2402/59

*** CLIMB BEGINS AT SL.**
**** CLIMB/CRUISE/DESCENT.**

Figure P-13. (Sheet 1)

Best Cruise Altitude for Short Range Mission — Maximum Range Descent

DATA BASIS FLIGHT TEST **ENGINE F100-PW-229**

CONDITIONS:

- **STANDARD DAY**
- **NO WIND**
- **MIL CLIMB AT SCHEDULED KIAS OR CONSTANT ALTITUDE OPTIMUM CRUISE MACH NO., WHICHEVER IS LOWER**
- **CRUISE AT CONSTANT ALTITUDE AT OPTIMUM MACH**
- **DESCEND AT IDLE WITH SPEEDBRAKES CLOSED**
- **DRAG INDEX/DESCENT SPEED KIAS = 0/215, 50/220, AND ≥ 100/230**

ST CL GW*	TOT MSN RG**	BEST CR ALT	TOTAL FUEL CONSUMED (LB)/DESCENT RANGE (NM)		
LB–1000	NM	FT–1000	DI 0	DI 100	DI 200
36.0	50	13.2	493/30	573/26	662/23
36.0	100	22.2	906/44	1049/41	1218/37
36.0	150	28.2	1258/54	1475/52	1725/47
36.0	200	30.6	1584/59	1866/57	2203/51
36.0	250	31.6	1905/61	2257/59	2656/53
40.0	50	10.8	523/25	617/21	714/19
40.0	100	20.2	975/38	1139/35	1325/32
40.0	150	26.1	1362/46	1610/46	1884/41
40.0	200	28.5	1731/50	2050/49	2413/45
40.0	250	29.3	2082/52	2477/51	2916/47
44.0	50	7.6	548/20	655/16	765/14
44.0	100	18.6	1045/33	1232/31	1435/28
44.0	150	24.2	1470/40	1748/40	2047/36
44.0	200	26.1	1866/43	2231/43	2625/39
44.0	250	27.1	2257/44	2702/44	3186/41
48.0	50	5.4	571/17	692/13	812/11
48.0	100	16.2	1114/28	1325/26	1547/24
48.0	150	21.0	1573/34	1886/33	2209/30
48.0	200	23.9	2004/37	2412/37	2846/34
48.0	250	25.3	2430/39	2931/39	3457/36

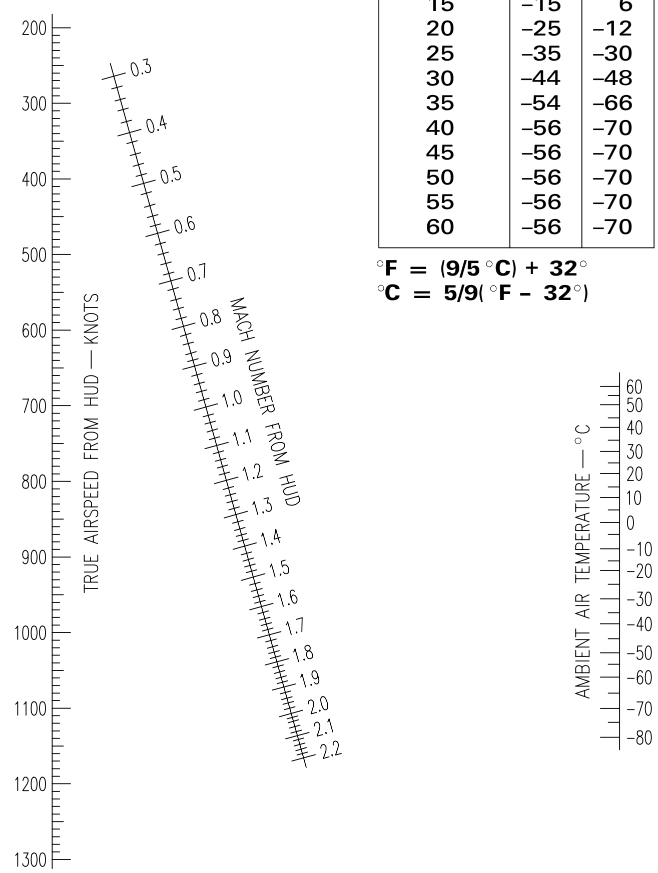
*** CLIMB BEGINS AT SL.**
**** CLIMB/CRUISE/DESCENT.**

Figure P-13. (Sheet 2)

Ambient Air Temperature

ALTITUDE —1000 FT	STD TEMP °C	STD TEMP °F
SL	15	59
5	5	41
10	–5	23
15	–15	6
20	–25	–12
25	–35	–30
30	–44	–48
35	–54	–66
40	–56	–70
45	–56	–70
50	–56	–70
55	–56	–70
60	–56	–70

°F = (9/5 °C) + 32°
°C = 5/9(°F – 32°)



1F–16X–1CL–1–0002X@

Figure P-14.

SECTION P/PW/CFT

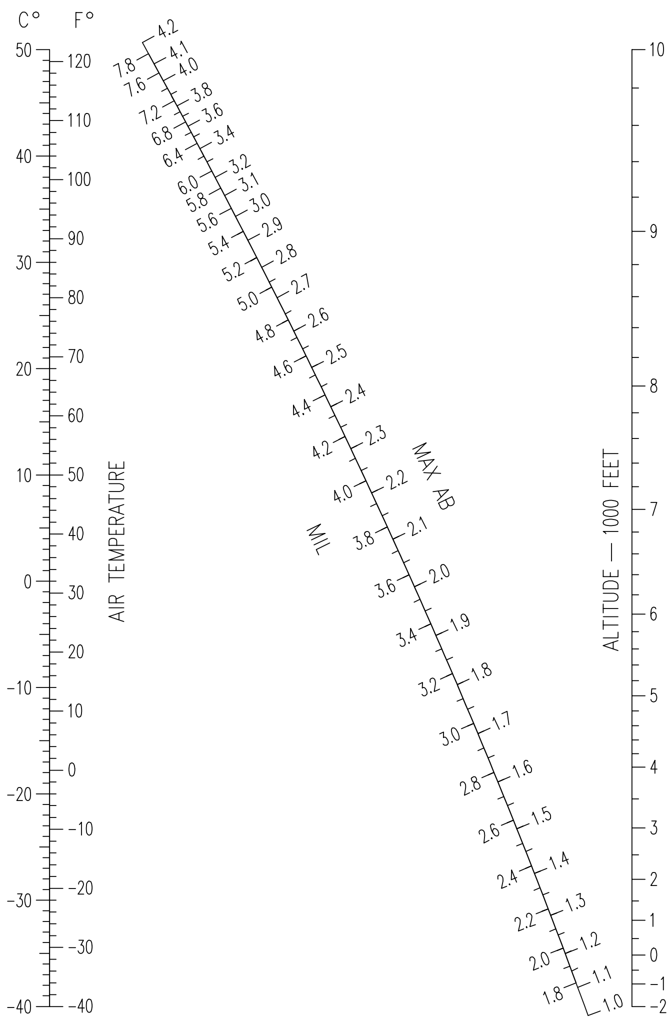
PERFORMANCE DATA

F100-PW-229 with Conformal Fuel Tanks

TABLE OF CONTENTS

Takeoff Factor

DATA BASIS FLT TEST **ENGINE F100–PW–229**



GR1F–16CJ–1CL–1–2004X37 @

Figure P-1.

Takeoff Speed and Distance

DATA BASIS ESTIMATED ENGINE F100–PW–229

CONFIGURATION:
- ALL DRAG INDEXES
- CG = 35% MAC
- ZERO ROLL TRIM

CONDITIONS:
- ALL ALTITUDES
- ALL TEMPERATURES
- 10 DEGREES PITCH ATTITUDE

NOTES:
Refer to sheet 2.

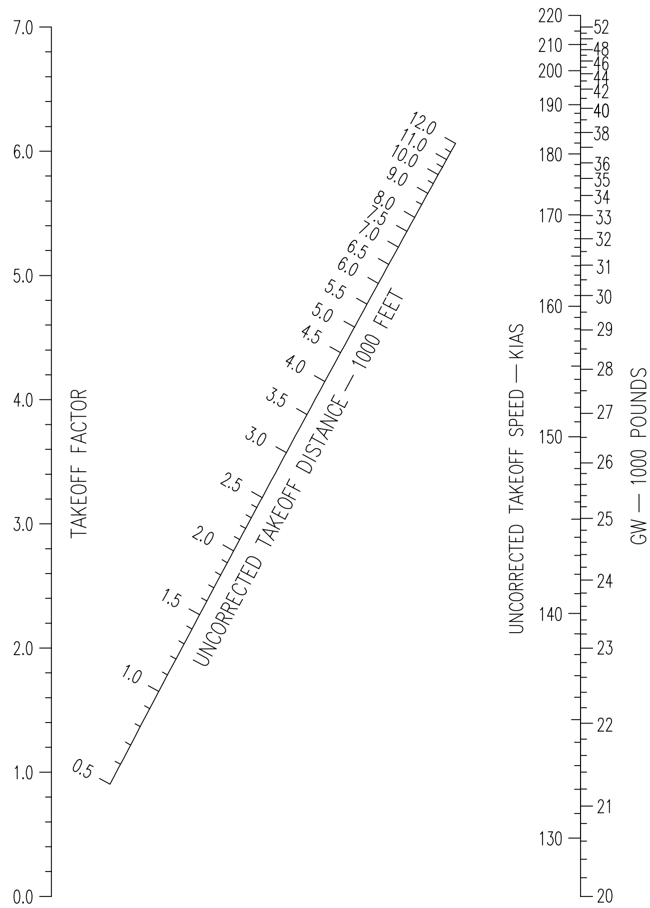


Figure P-2. (Sheet 1)

Takeoff Speed and Distance

DATA BASIS ESTIMATED **ENGINE F100-PW-229**

CONFIGURATION:

- **ALL DRAG INDEXES**
- **CG=35% MAC**
- **ZERO ROLL TRIM**

CONDITIONS:

- **ALL ALTITUDES**
- **ALL TEMPERATURES**
- **10 DEGREES PITCH ATTITUDE**

NOTES:

- ROTATE AT 10 KIAS (NON-AB) OR 15 KIAS (AB) LESS THAN TAKEOFF SPEED.
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- INCREASE TAKEOFF SPEED 8% AND DISTANCE 18% FOR AN 8° PITCH ATTITUDE ROTATION.
- INCREASE/DECREASE TAKEOFF SPEED 0.8 KIAS FOR EACH 1% FORWARD/AFT OF 35% MAC.
- INCREASE/DECREASE DISTANCE 1% FOR EACH 1% FORWARD/AFT OF 35% MAC.
- INCREASE DISTANCE 2% PER 100 DRAG INDEX.
- INCREASE DISTANCE 4% PER 1% UPSLOPE.
- DECREASE DISTANCE 3.5% PER 1% DOWNSLOPE.
- INCREASE DISTANCE 11% PER 10 KTS TAILWIND.
- DECREASE DISTANCE 10% PER 10 KTS HEADWIND.
- FOR TAKEOFF SPEED CORRECTION WITH ROLL TRIM OTHER THAN ZERO, REFER TO TAKEOFF ROLL TRIM WITH ASYMMETRIC STORES, FIGURE N-1, PAGE N-8.

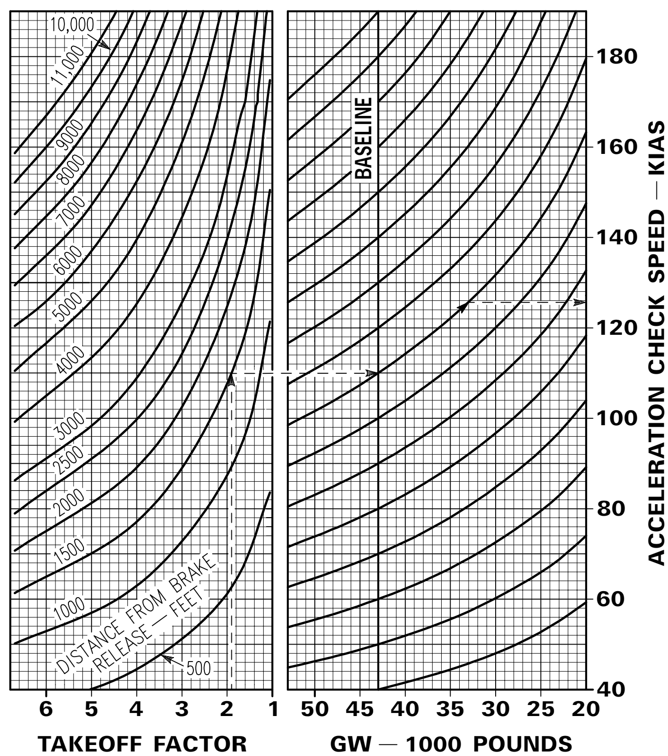
Figure P-2. (Sheet 2)

Acceleration Check Speed

DATA BASIS ESTIMATED   ENGINE F100–PW–229

NOTES:

- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE SPEED 1% PER 100 DRAG INDEX.
- INCREASE SPEED 7.6 KIAS PER 10 KTS HEADWIND.
- DECREASE SPEED 7.7 KIAS PER 10 KTS TAILWIND.
- INCREASE SPEED 3.6% PER 1% DOWNHILL SLOPE.
- DECREASE SPEED 3.8% PER 1% UPHILL SLOPE.



GR1F–16CJ–1CL–1–2006X37 @

Figure P-3.

Ground Vehicle Friction Reading-To-RCR Conversion

NOTES:

- IN MANY AREAS, GROUND VEHICLE FRICTION READING IS THE ONLY AVAILABLE MEASURE FOR RUNWAY BRAKING ACTION.
- NORMALLY THE GROUND VEHICLE FRICTION READING, ALSO REFERRED TO AS BRAKING ACTION COEFFICIENT, IS GIVEN AS WHOLE NUMBERS, NOT AS DECIMALS (I.E., 40 INSTEAD OF 0.40).

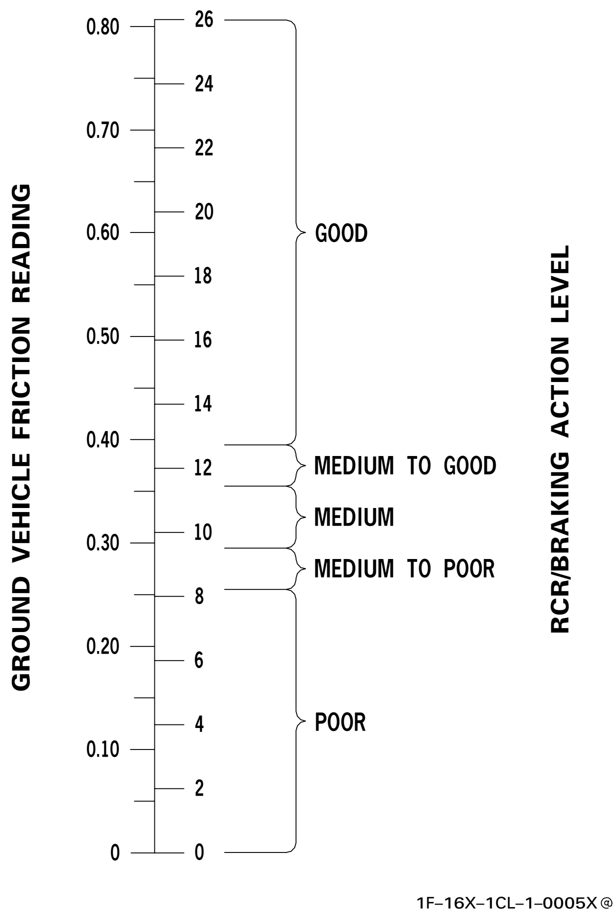


Figure P-4.

Refusal Speed

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **GW = 32,000 LB**

CONDITIONS:
- **IDLE SELECTED AT REFUSAL SPEED**
- **MAX EFFORT BRAKING**
- **DRY CONCRETE (RCR = 23)**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- FOR RCR = 16 (DRY) DECREASE NON–AB/AB REFUSAL SPEED BY 4/5 KIAS.
- INCREASE/DECREASE REFUSAL SPEED 1.1%/0.9% WITH NON–AB AND 0.7%/0.7% WITH AB PER 1000 LB LESS/ ADDITIONAL GW.
- INCREASE/DECREASE REFUSAL SPEED 5/5 KIAS WITH NON–AB AND 6/6 KIAS WITH AB PER 5 KTS HEADWIND/TAILWIND.
- INCREASE/DECREASE REFUSAL SPEED 0.5/1.0 KIAS WITH NON–AB AND 1.5/2.0 KIAS WITH AB PER 1% UPSLOPE/ DOWNSLOPE.

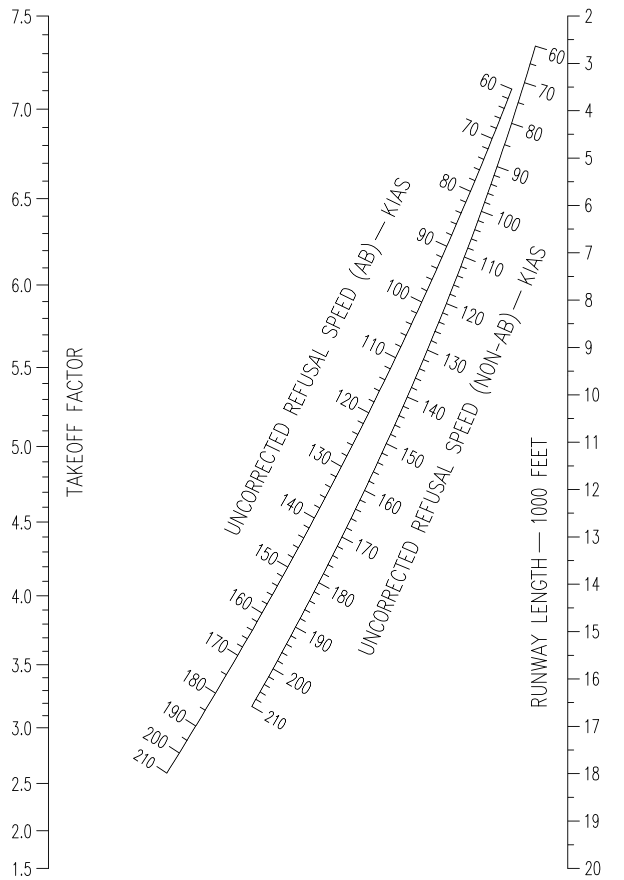


Figure P-5. (Sheet 1)

Refusal Speed

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **GW = 32,000 LB**

CONDITIONS:
- **IDLE SELECTED AT REFUSAL SPEED**
- **MAX EFFORT BRAKING**
- **WET CONCRETE (RCR = 18)**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- FOR RCR = 12 (WET) DECREASE NON–AB/AB REFUSAL SPEED BY 9/10 KIAS.
- INCREASE/DECREASE REFUSAL SPEED 0.6%/0.4% WITH NON–AB AND 0.2%/0.2% WITH AB PER 1000 LB LESS/ ADDITIONAL GW.
- INCREASE/DECREASE REFUSAL SPEED 6/7 KIAS WITH NON–AB AND 7/8 KIAS WITH AB PER 5 KTS HEADWIND/TAILWIND.
- INCREASE/DECREASE REFUSAL SPEED 2.5/4.5 KIAS WITH NON–AB AND 4.0/5.5 KIAS WITH AB PER 1% UPSLOPE/ DOWNSLOPE.

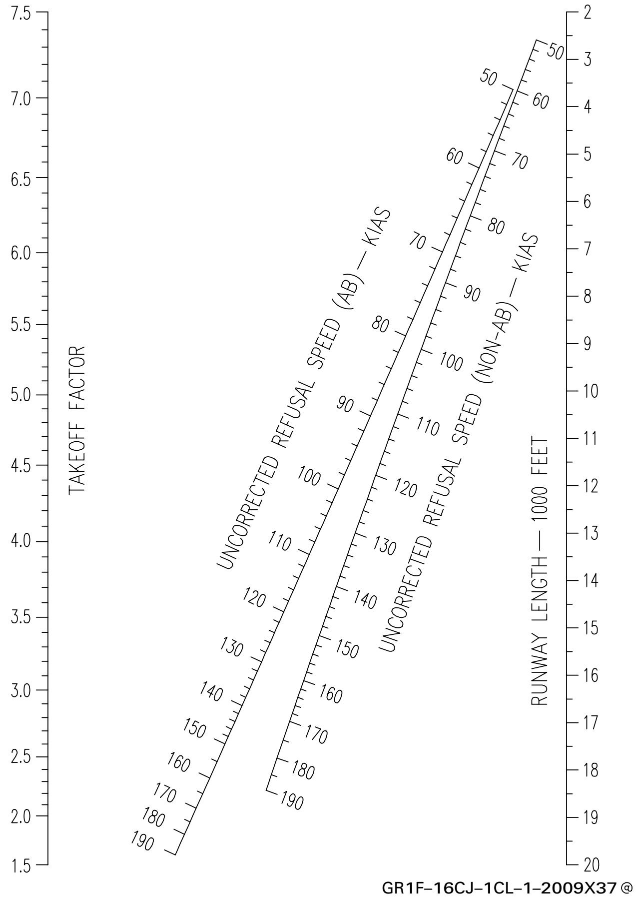


Figure P-5. (Sheet 2)

Refusal Speed

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:

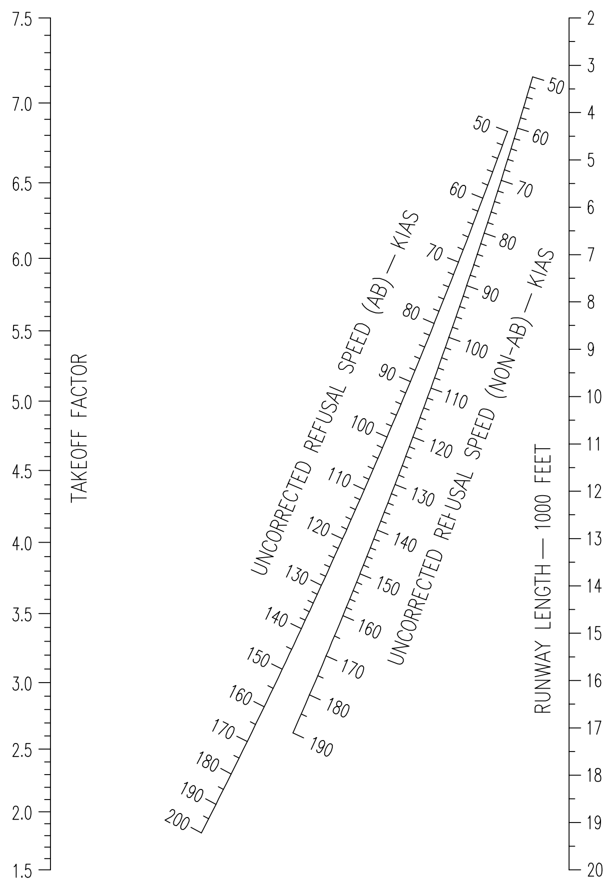
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **GW = 32,000 LB**

CONDITIONS:

- **IDLE SELECTED AT REFUSAL SPEED**
- **MAX EFFORT BRAKING**
- **SNOW (RCR = 8)**

NOTES:

- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- INCREASE/DECREASE REFUSAL SPEED 0.6%/0.5% WITH NON–AB AND 0.1%/0.2% WITH AB PER 1000 LB LESS/ADDITIONAL GW.
- INCREASE/DECREASE REFUSAL SPEED 6/6.5 KIAS WITH NON–AB AND 7/7 KIAS WITH AB PER 5 KTS HEADWIND/TAILWIND.
- INCREASE/DECREASE REFUSAL SPEED 2.5/4.5 KIAS WITH NON–AB AND 4/6 KIAS WITH AB PER 1% UPSLOPE/DOWNSLOPE.



GR1F–16CJ–1CL–1–2010X37 @

Figure P-5. (Sheet 3)

Refusal Speed

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **GW = 32,000 LB**

CONDITIONS:
- **IDLE SELECTED AT REFUSAL SPEED**
- **MAX EFFORT BRAKING**
- **ICY (RCR = 4)**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE/INCREASE REFUSAL SPEED 0.0%/0.2% WITH NON–AB AND 0.7%/0.2% WITH AB PER 1000 LB LESS/ADDITIONAL GW.
- INCREASE/DECREASE REFUSAL SPEED 6/6.5 KIAS WITH NON–AB AND 7/7 KIAS WITH AB PER 5 KTS HEADWIND/TAILWIND.
- INCREASE/DECREASE REFUSAL SPEED 2.5/4.5 KIAS WITH NON–AB AND 4/6 KIAS WITH AB PER 1% UPSLOPE/DOWNSLOPE.

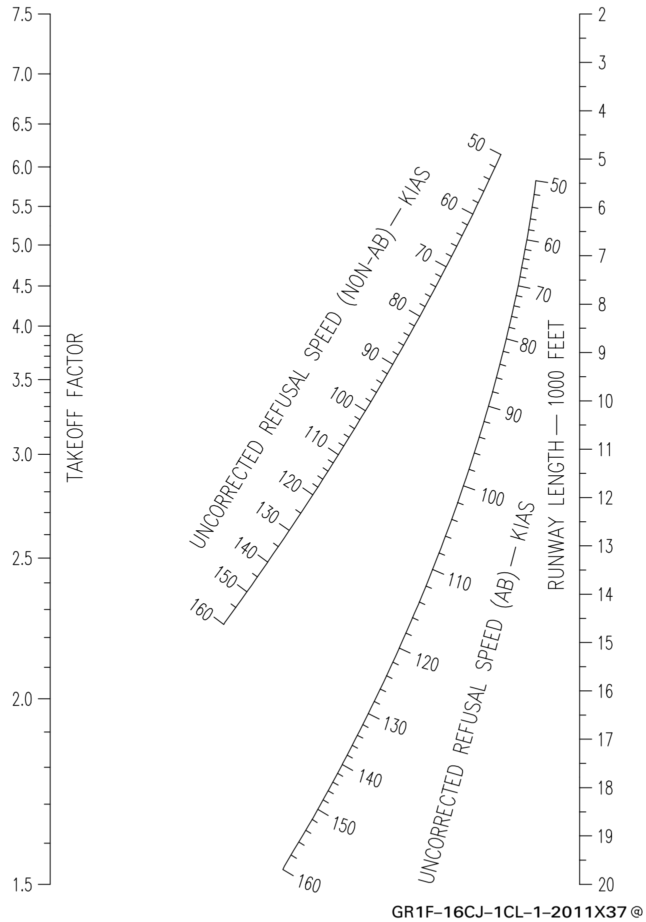


Figure P-5. (Sheet 4)

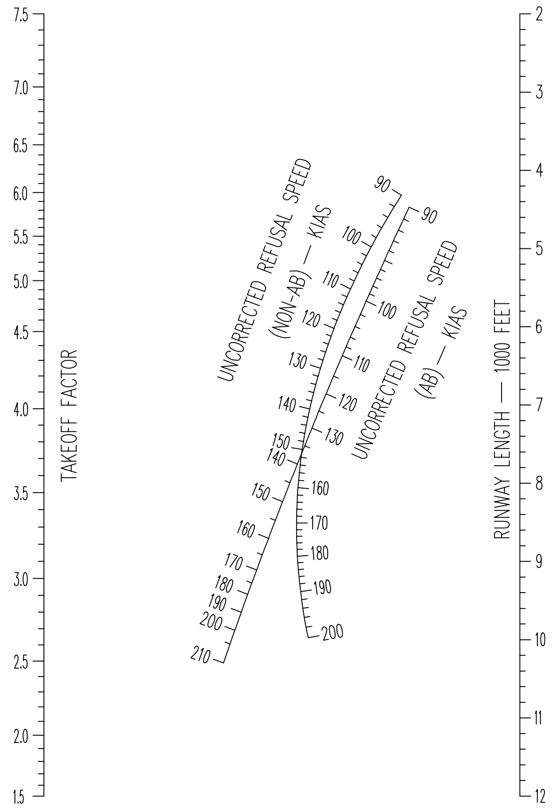
Refusal Speed With Drag Chute

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **DRAG CHUTE — DEPLOYED**
- **GW = 32,000 LB**

CONDITIONS:
- **IDLE SELECTED AND DRAG CHUTE DEPLOYED AT REFUSAL SPEED**
- **MAX EFFORT BRAKING**
- **DRY CONCRETE (RCR = 23)**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- FOR RCR = 16 (DRY) DECREASE NON-AB/AB DRY RUNWAY REFUSAL SPEED BY 2.5/3.5 KIAS.
- INCREASE/DECREASE REFUSAL SPEED 1.8%/1.1% WITH NON–AB AND 1.7%/1.1% WITH AB PER 1000 LB LESS/ ADDITIONAL GW.
- INCREASE/DECREASE REFUSAL SPEED 6/6 KIAS WITH NON–AB AND 7/7 KIAS WITH AB PER 5 KTS HEADWIND/TAILWIND.
- DECREASE/INCREASE REFUSAL SPEED 1/0.5 KIAS WITH NON–AB AND INCREASE/DECREASE REFUSAL SPEED 0.5/0.5 KIAS WITH AB PER 1% UPSLOPE/DOWNSLOPE.



GR1F–16CJ–1CL–1–2012X37

Figure P-6. (Sheet 1)

Refusal Speed With Drag Chute

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **DRAG CHUTE — DEPLOYED**
- **GW = 32,000 LB**

CONDITIONS:
- **IDLE SELECTED AND DRAG CHUTE DEPLOYED AT REFUSAL SPEED**
- **MAX EFFORT BRAKING**
- **WET CONCRETE (RCR = 18)**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- FOR RCR = 12 (WET) DECREASE NON-AB/AB WET RUNWAY REFUSAL SPEED BY 6/8.5 KIAS.
- INCREASE/DECREASE REFUSAL SPEED 2.1%/1.1% WITH NON–AB AND 2.1%/1.0% WITH AB PER 1000 LB LESS/ ADDITIONAL GW.
- INCREASE/DECREASE REFUSAL SPEED 7/8 KIAS WITH NON-AB AND 8/9 KIAS WITH AB PER 5 KTS HEADWIND/TAILWIND.
- INCREASE/DECREASE REFUSAL SPEED 0/0.5 KIAS WITH NON–AB AND 1.5/2 KIAS WITH AB PER 1% UPSLOPE/ DOWNSLOPE.

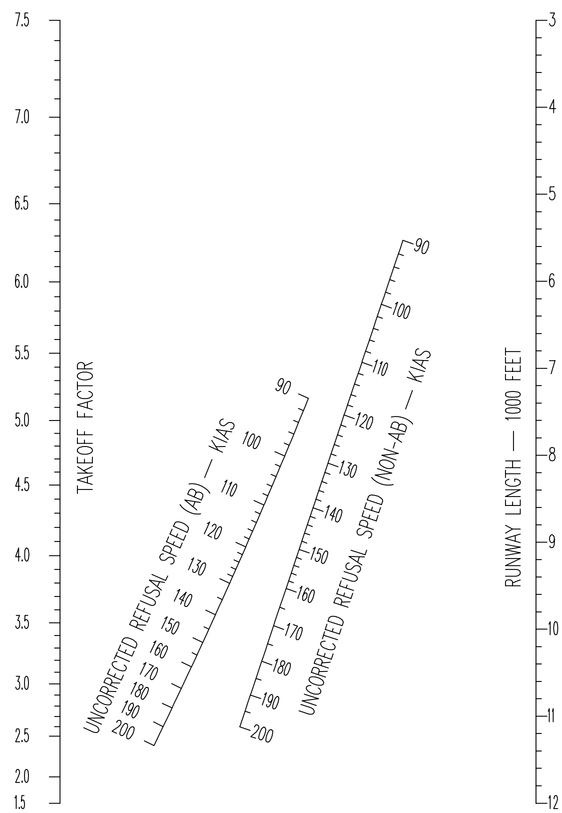


Figure P-6. (Sheet 2)

Refusal Speed With Drag Chute

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:

- ALL DRAG INDEXES
- SPEEDBRAKES — OPEN
- DRAG CHUTE — DEPLOYED
- GW = 32,000 LB

CONDITIONS:

- IDLE SELECTED AND DRAG CHUTE DEPLOYED AT REFUSAL SPEED
- MAX EFFORT BRAKING
- SNOW (RCR = 8)

NOTES:

- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- INCREASE/DECREASE REFUSAL SPEED 2.1%/1.1% WITH NON–AB AND 2.0%/1.0% WITH AB PER 1000 LB LESS/ADDITIONAL GW.
- INCREASE/DECREASE REFUSAL SPEED 7/8 KIAS WITH NON–AB AND 9/10 KIAS WITH AB PER 5 KTS HEADWIND/TAILWIND.
- INCREASE/DECREASE REFUSAL SPEED 0.5/1.5 KIAS WITH NON–AB AND 2.0/3.5 KIAS WITH AB PER 1% UPSLOPE/DOWNSLOPE.

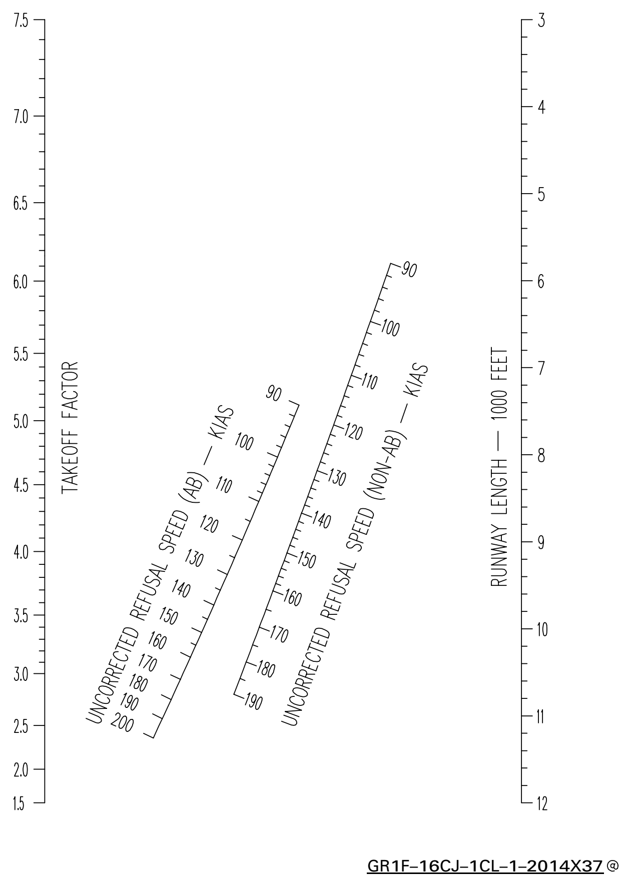


Figure P-6. (Sheet 3)

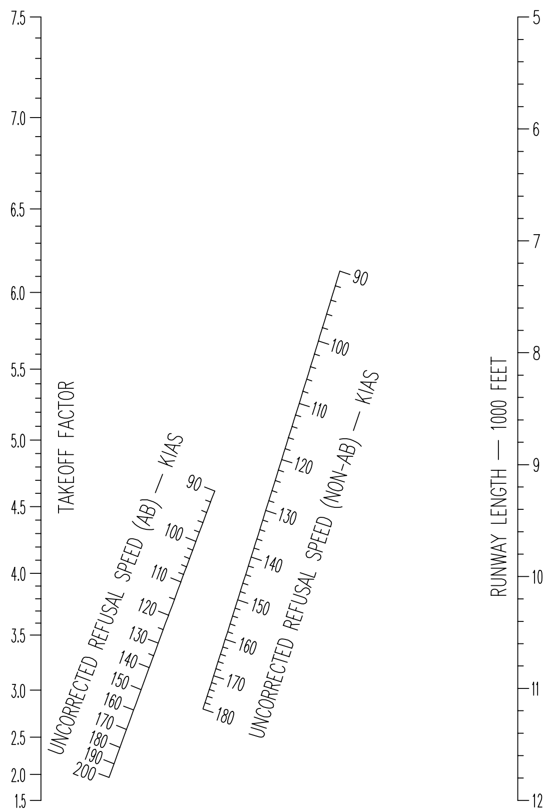
Refusal Speed With Drag Chute

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **DRAG CHUTE — DEPLOYED**
- **GW = 32,000 LB**

CONDITIONS:
- **IDLE SELECTED AND DRAG CHUTE DEPLOYED AT REFUSAL SPEED**
- **MAX EFFORT BRAKING**
- **ICY (RCR = 4)**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE/INCREASE REFUSAL SPEED 2.2%/1.1% WITH NON–AB AND 2.0%/1.0% WITH AB PER 1000 LB LESS/ ADDITIONAL GW.
- INCREASE/DECREASE REFUSAL SPEED 10/12 KIAS WITH NON–AB AND 12/14 KIAS WITH AB PER 5 KTS HEADWIND/TAILWIND.
- INCREASE/DECREASE REFUSAL SPEED 2.5/8.5 KIAS WITH NON–AB AND 5/11 KIAS WITH AB PER 1% UPSLOPE DOWNSLOPE.



GR1F–16CJ–1CL–1–2015X37 @

Figure P-6. (Sheet 4)

Landing Density Factor

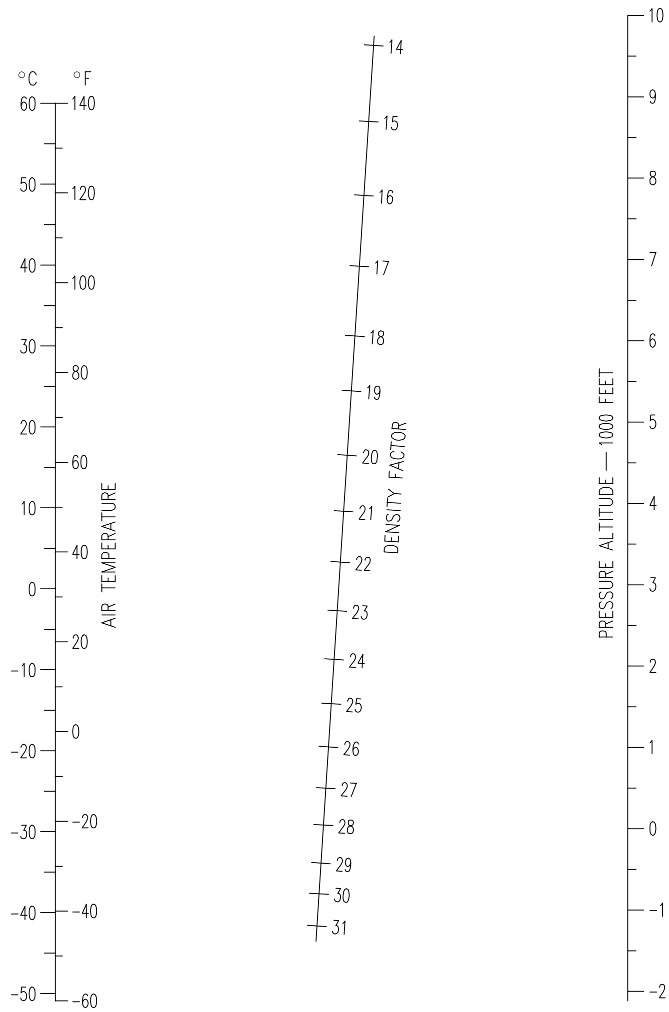


Figure P-7.

Approach Speeds

DATA BASIS ESTIMATED **ENGINE F100-PW-229**

CONFIGURATION:
- ALL DRAG INDEXES

CONDITIONS
- ALL TEMPERATURES
- ALL ALTITUDES
- 13 DEGREES AOA (INDEXER ON SPEED)

NOTE:
ACTUAL APPROACH AIRSPEED AT 11/13 DEGREES AOA MAY DIFFER BY +/-5 KNOTS DUE TO VARIATIONS IN AIRCRAFT CG.

GROSS WEIGHT (LB)	AIRSPEED (KIAS)
19,000	132
20,000	136
21,000	139
22,000	142
23,000	146
24,000	149
25,000	152
26,000	155
27,000	158
28,000	161
29,000	164
30,000	166
31,000	169
32,000	172
33,000	174
34,000	177
35,000	180
36,000	182
37,000	185
38,000	187
39,000	190
40,000	192
41,000	195
42,000	197
43,000	199
44,000	201
45,000	204
46,000	206
47,000	208
48,000	210
49,000	213
50,000	215
51,000	217
52,000	219
	NOTE: Add 8 KIAS for an 11° AOA approach

Figure P-8.

Short Field Landing Distance

DATA BASIS ESTIMATED **ENGINE F100-PW-229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**

CONDITIONS:
- **TOUCHDOWN AT 13 DEGREES AOA**
- **ZERO WIND AND SLOPE**
- **IDLE**
- **MAX EFFORT BRAKING**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE DISTANCE 1.5% PER 1 KT HEADWIND.
- INCREASE DISTANCE 2.2% PER 1 KT TAILWIND.
- DECREASE DISTANCE 5.0% PER 1% UPSLOPE.
- INCREASE DISTANCE 7.0% PER 1% DOWNSLOPE.

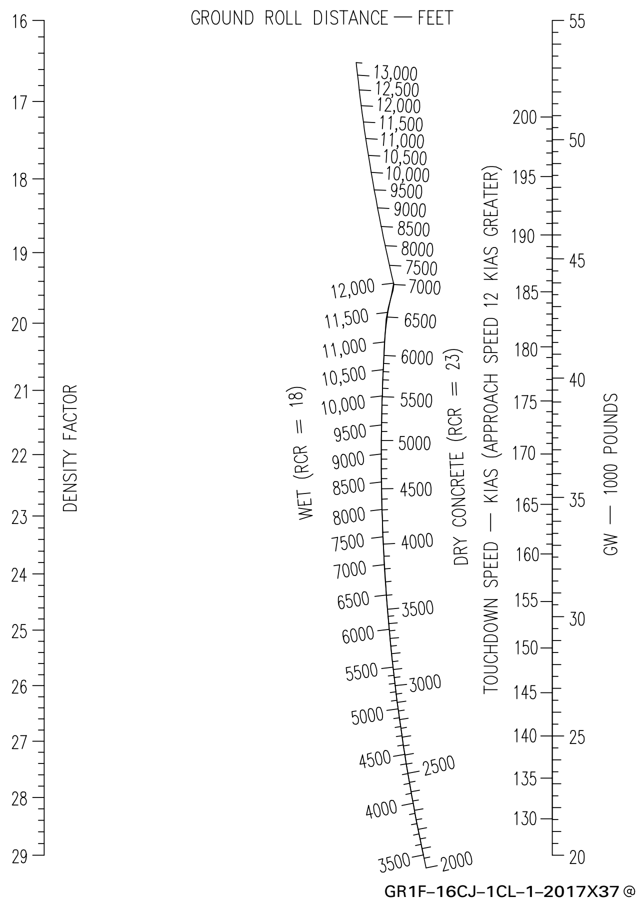


Figure P-9. (Sheet 1)

Short Field Landing Distance

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**

CONDITIONS:
- **TOUCHDOWN AT 13 DEGREES AOA**
- **ZERO WIND AND SLOPE**
- **IDLE**
- **MAX EFFORT BRAKING**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE DISTANCE 1.5% PER 1 KT HEADWIND.
- INCREASE DISTANCE 2.2% PER 1 KT TAILWIND.
- DECREASE DISTANCE 5.0% PER 1% UPSLOPE.
- INCREASE DISTANCE 7.0% PER 1% DOWNSLOPE.

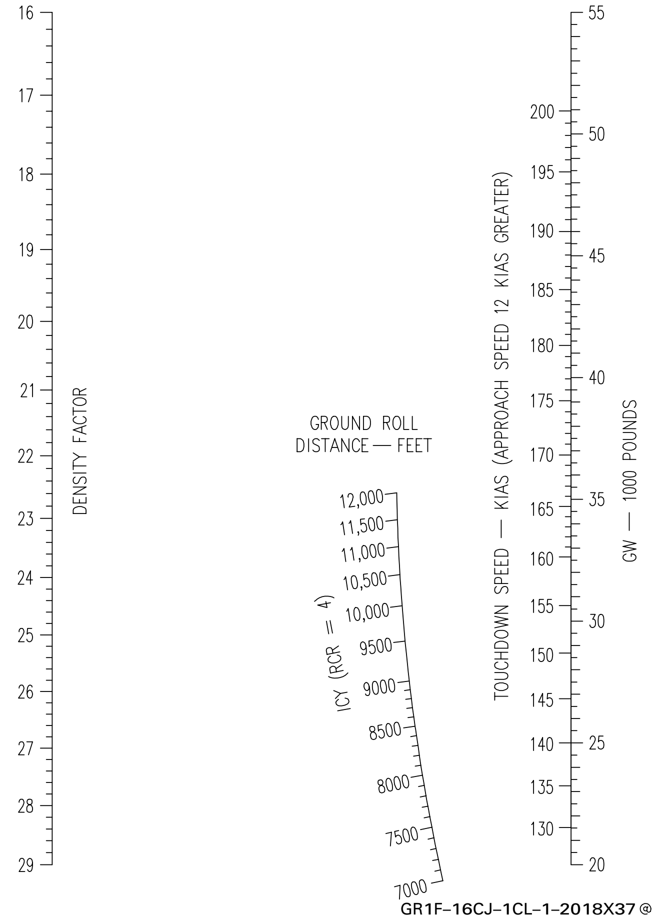


Figure P-9. (Sheet 2)

Short Field Landing Distance — SEC

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**

CONDITIONS:
- **TOUCHDOWN AT 13 DEGREES AOA**
- **ZERO WIND AND SLOPE**
- **IDLE**
- **MAX EFFORT BRAKING**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE DISTANCE 1.5% PER 1 KT HEADWIND.
- INCREASE DISTANCE 2.2% PER 1 KT TAILWIND.
- DECREASE DISTANCE 5.0% PER 1% UPSLOPE.
- INCREASE DISTANCE 7.0% PER 1% DOWNSLOPE.

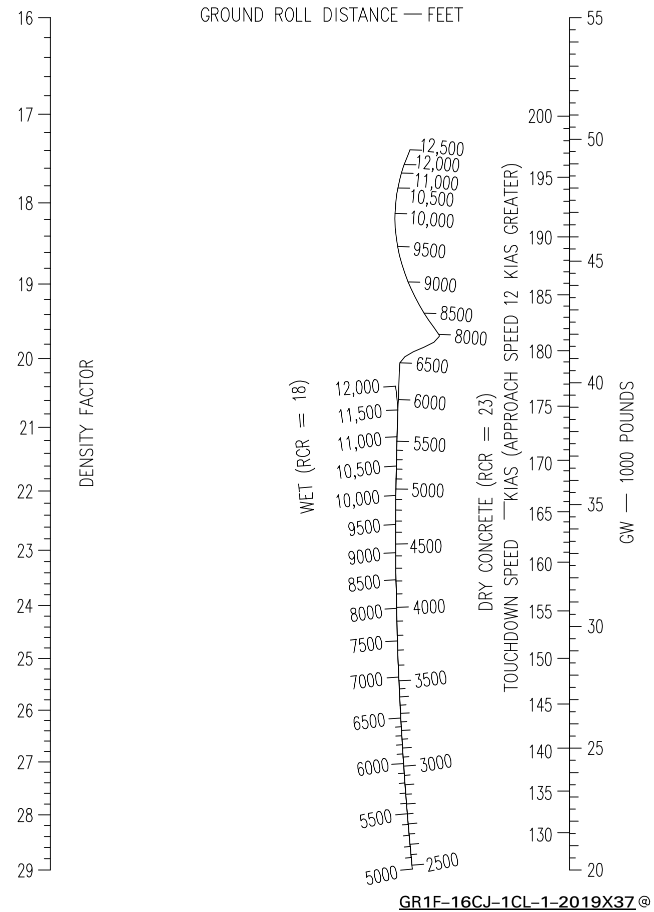


Figure P-9. (Sheet 3)

Short Field Landing Distance With Drag Chute

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **DRAG CHUTE — DEPLOYED BELOW 170 KNOTS**

CONDITIONS:
- **TOUCHDOWN AT 13 DEGREES AOA**
- **ZERO WIND AND SLOPE**
- **IDLE**
- **MAX EFFORT BRAKING**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE DISTANCE 1.5% PER 1 KT HEADWIND.
- INCREASE DISTANCE 2.2% PER 1 KT TAILWIND.
- DECREASE DISTANCE 5.0% PER 1% UPSLOPE.
- INCREASE DISTANCE 7.0% PER 1% DOWNSLOPE.

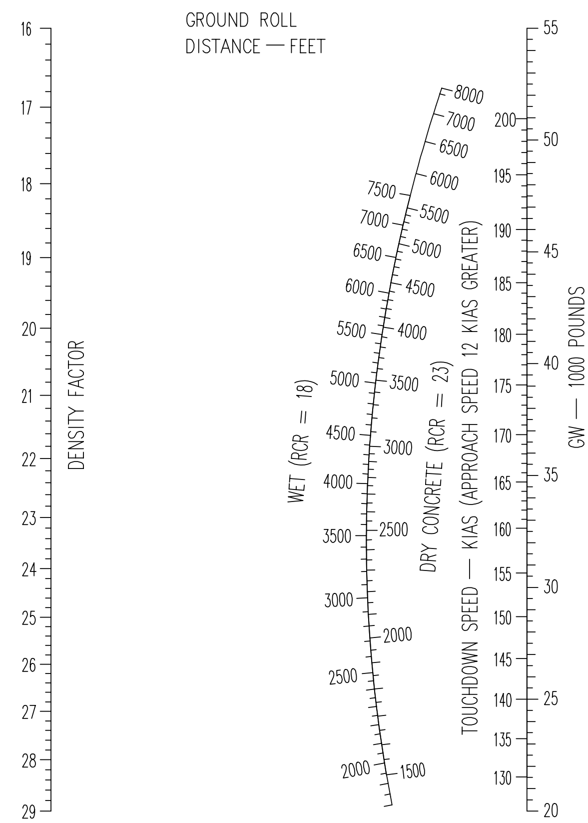


Figure P-9. (Sheet 4)

Short Field Landing Distance With Drag Chute

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:

- **ALL DRAG INDEXES**
- **SPEEDBRAKES— OPEN**
- **DRAG CHUTE— DEPLOYED BELOW 170 KNOTS**

CONDITIONS:

- **TOUCHDOWN AT 13 DEGREES AOA**
- **ZERO WIND AND SLOPE**
- **IDLE**
- **MAX EFFORT BRAKING**

NOTES:

- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE DISTANCE 1.5% PER 1 KT HEADWIND.
- INCREASE DISTANCE 2.2% PER 1 KT TAILWIND.
- DECREASE DISTANCE 5.0% PER 1% UPSLOPE.
- INCREASE DISTANCE 7.0% PER 1% DOWNSLOPE.

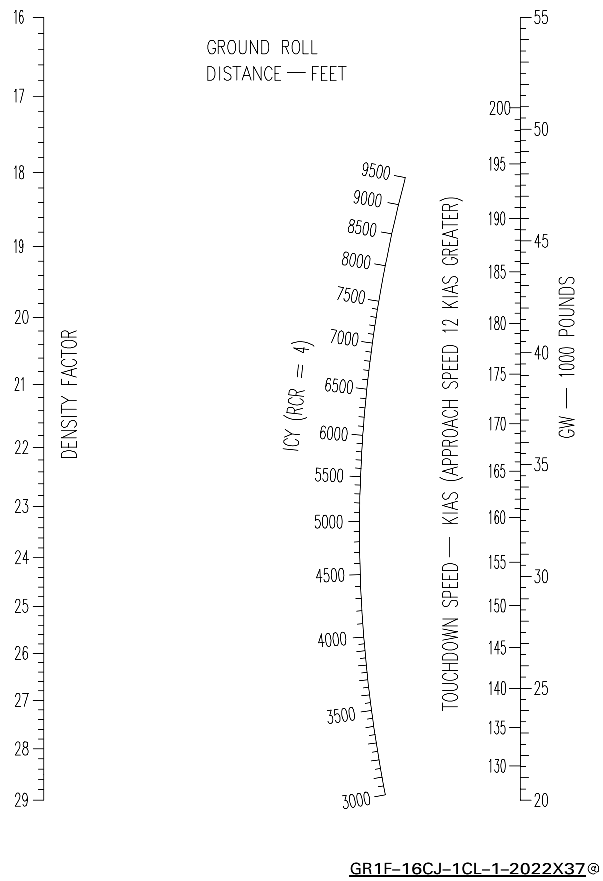


Figure P-9. (Sheet 5)

Short Field Landing Distance — SEC With Drag Chute

DATA BASIS ESTIMATED

ENGINE F100–PW–229

CONFIGURATION:

- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **DRAG CHUTE — DEPLOYED BELOW 170 KNOTS**

CONDITIONS:

- **TOUCHDOWN AT 13 DEGREES AOA**
- **ZERO WIND AND SLOPE**
- **IDLE**
- **MAX EFFORT BRAKING**

NOTES:

- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE DISTANCE 1.5% PER 1 KT HEADWIND.
- INCREASE DISTANCE 2.2% PER 1 KT TAILWIND.
- DECREASE DISTANCE 5.0% PER 1% UPSLOPE.
- INCREASE DISTANCE 7.0% PER 1% DOWNSLOPE.

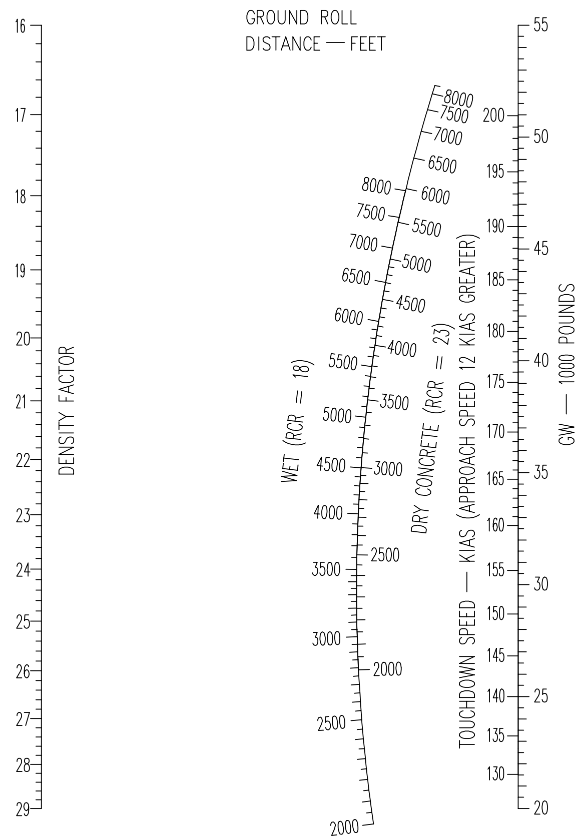


Figure P-9. (Sheet 6)

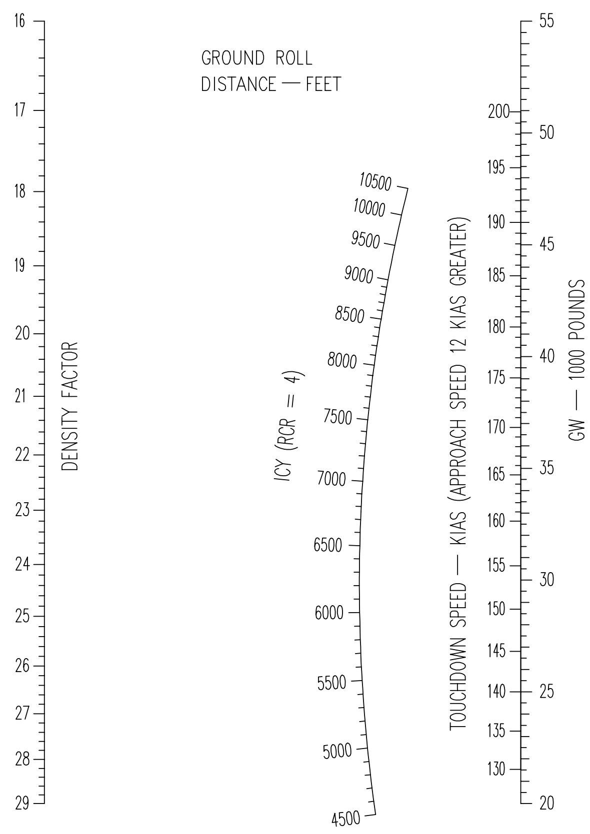
Short Field Landing Distance — SEC With Drag Chute

DATA BASIS ESTIMATED **ENGINE F100–PW–229**

CONFIGURATION:
- **ALL DRAG INDEXES**
- **SPEEDBRAKES — OPEN**
- **DRAG CHUTE — DEPLOYED BELOW 170 KNOTS**

CONDITIONS:
- **TOUCHDOWN AT 13 DEGREES AOA**
- **ZERO WIND AND SLOPE**
- **IDLE**
- **MAX EFFORT BRAKING**

NOTES:
- COMPUTE % INCREASE/DECREASE CHANGES INDIVIDUALLY.
- DECREASE DISTANCE 1.5% PER 1 KT HEADWIND.
- INCREASE DISTANCE 2.2% PER 1 KT TAILWIND.
- DECREASE DISTANCE 5.0% PER 1% UPSLOPE.
- INCREASE DISTANCE 7.0% PER 1% DOWNSLOPE.



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Figure P-9. (Sheet 7)

Climb/Optimum Cruise — Drag Index = 0

DATA BASIS ESTIMATED **ENGINE F100-PW-229**
FUEL JP-8

NOTES:
- STD DAY/FULLY SERVICED FUEL = 10,172 LB.
- 800-LB FUEL ALLOWANCE FOR GROUND OPERATION AND TAKEOFF/ACCELERATION TO MIL CLIMB AIRSPEED (ASSUME 30-MIN GROUND TIME).
- CLIMB AT KIAS/MACH NO., WHICHEVER IS SLOWER.

MIL CLIMB					OPTIMUM CRUISE	
					AT LEVEL OFF	
ALT 1000 FEET	CLIMB @ KIAS/MACH	TIME (MIN)	DIST (NM)	FUEL REMAINING AT LEVEL OFF (LB)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)
45	---	---	---	---	---	---
40	445/0.83	7.1	52.7	8613	0.83/252/474	2479
35	445/0.84	3.8	31.4	8785	0.84/288/485	2697
30	445/0.80	2.8	22.3	8891	0.80/304/471	2776
25	445/0.76	2.1	16.0	8981	0.76/321/460	2967
20	445/0.70	1.5	10.7	9077	0.70/324/430	3068
10	0.60	0.7	4.1	9221	0.60/333/383	3417
0	0.51	0.0	0.0	9372	0.51/335/335	3756

OPTIMUM CRUISE						
	7000 LB REMAINING		5000 LB REMAINING		2000 LB REMAINING	
ALT 1000 FEET	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)
45	---	---	---	---	---	---
40	0.87/268/501	2691	0.87/268/502	2488	0.84/256/482	2148
35	0.84/286/483	2561	0.81/276/468	2352	0.80/272/461	2136
30	0.80/304/471	2665	0.80/304/471	2555	0.76/289/450	2309
25	0.75/315/452	2811	0.73/307/440	2655	0.70/293/421	2418
20	0.70/324/430	2980	0.70/323/429	2897	0.66/302/403	2609
10	0.60/333/383	3330	0.58/322/370	3143	0.54/299/345	2821
0	0.50/330/330	3616	0.48/321/321	3439	0.45/300/300	3115

Figure P-10. (Sheet 1)

Climb/Optimum Cruise — Drag Index = 22

DATA BASIS FLIGHT ESTIMATED ENGINE F100-PW-229
FUEL JP-8

NOTES:
- STD DAY/FULLY SERVICED FUEL = 10,172 LB + 2040 LB= 12,212 LB.
- 800-LB FUEL ALLOWANCE FOR GROUND OPERATION AND TAKEOFF/ACCELERATION TO MIL CLIMB AIRSPEED (ASSUME 30-MIN GROUND TIME).
- CLIMB AT KIAS/MACH NO., WHICHEVER IS SLOWER.

MIL CLIMB					OPTIMUM CRUISE	
					AT LEVEL OFF	
ALT 1000 FEET	CLIMB @ KIAS/MACH	TIME (MIN)	DIST (NM)	FUEL REMAINING AT LEVEL OFF (LB)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)
45	---	---	---	---	---	---
40	441/0.87	8.0	67.5	10,454	0.87/268/501	3331
35	441/0.85	4.6	38.2	10,712	0.85/291/490	3078
30	441/0.80	3.3	26.4	10,850	0.80/304/472	3082
25	441/0.77	2.4	18.9	10,956	0.77/325/465	3295
20	441/0.70	1.7	12.4	11,072	0.70/324/430	3319
10	0.60	0.8	4.7	11,242	0.60/333/383	3667
0	0.52	0.0	0.0	11,412	0.52/343/343	4099

OPTIMUM CRUISE						
	7000 LB REMAINING		5000 LB REMAINING		2000 LB REMAINING	
ALT 1000 FEET	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)
45	---	---	---	---	---	---
40	0.85/259/488	2797	0.85/259/487	2597	0.84/256/482	2298
35	0.83/283/479	2704	0.80/272/461	2468	0.80/272/461	2277
30	0.80/304/471	2838	0.79/301/467	2704	0.75/283/442	2399
25	0.74/311/446	2951	0.72/300/432	2754	0.70/293/421	2545
20	0.70/323/430	3133	0.69/317/421	2991	0.64/297/396	2694
10	0.59/329/378	3446	0.57/315/362	3227	0.53/294/338	2899
0	0.49/326/326	3731	0.48/314/314	3517	0.45/295/295	3192

Figure P-10. (Sheet 2)

Climb/Optimum Cruise — Drag Index = 53

DATA BASIS ESTIMATED | **ENGINE F100-PW-229**
FUEL JP-8

NOTES:
- STD DAY/FULLY SERVICED FUEL = 10,172 LB + 5032 LB= 15,204 LB.
- 800-LB FUEL ALLOWANCE FOR GROUND OPERATION AND TAKEOFF/ACCELERATION TO MIL CLIMB AIRSPEED (ASSUME 30-MIN GROUND TIME).
- CLIMB AT KIAS/MACH NO., WHICHEVER IS SLOWER.

MIL CLIMB					OPTIMUM CRUISE	
					AT LEVEL OFF	
ALT 1000 FEET	CLIMB @ KIAS/MACH	TIME (MIN)	DIST (NM)	FUEL REMAINING AT LEVEL OFF (LB)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)
40	---	---	---	---	---	---
35	434/0.85	6.2	51.4	13,500	0.85/291/490	3606
30	434/0.82	4.2	33.6	13,700	0.82/311/481	3621
25	434/0.78	3.0	23.4	13,845	0.78/329/471	3777
20	434/0.71	2.1	15.2	13,991	0.71/327/434	3754
10	0.60	0.9	5.5	14,206	0.60/335/384	4034
0	0.53	0.0	0.0	14,404	0.53/350/350	4552

OPTIMUM CRUISE						
	10,000 LB REMAINING		7000 LB REMAINING		2000 LB REMAINING	
ALT 1000 FEET	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)
40	---	---	---	---	---	---
35	0.84/287/484	3215	0.83/282/476	2904	0.80/272/461	2453
30	0.80/304/471	3256	0.80/303/471	3059	0.74/281/439	2568
25	0.75/315/452	3378	0.72/302/434	3079	0.70/292/421	2720
20	0.70/324/430	3494	0.70/323/429	3335	0.63/288/384	2777
10	0.60/333/383	3826	0.57/318/365	3529	0.51/285/328	2970
0	0.50/330/330	4109	0.48/316/316	3809	0.43/287/287	3272

Figure P-10. (Sheet 3)

Climb/Optimum Cruise — Drag Index = 79

DATA BASIS ESTIMATED **ENGINE F100-PW-229**
FUEL JP-8

NOTES:
- STD DAY/FULLY SERVICED FUEL = 10,172 LB + 5032 LB + 2040 LB = 17,244 LB.
- 1400-LB FUEL ALLOWANCE FOR GROUND OPERATION AND MAX AB TAKEOFF/ACCELERATION TO MIL CLIMB AIRSPEED (ASSUME 30-MIN GROUND TIME).
- TAKEOFF AND CLIMB TO MIL CLIMB AIRSPEED WITH MAX AB.
- CLIMB AT KIAS/MACH NO., WHICHEVER IS SLOWER.

MIL CLIMB					OPTIMUM CRUISE	
					AT LEVEL OFF	
ALT 1000 FEET	CLIMB @ KIAS/MACH	TIME (MIN)	DIST (NM)	FUEL REMAINING AT LEVEL OFF (LB)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)
40	---	---	---	---	---	---
35	421/0.85	8.2	67.0	14,718	0.85/291/490	4026
30	421/0.82	5.0	40.0	15,014	0.82/313/484	3996
25	421/0.78	3.5	27.2	15,198	0.78/329/470	4112
20	421/0.70	2.4	17.4	15,371	0.70/326/433	4050
10	0.60	1.0	6.1	15,626	0.60/334/383	4297
0	0.53	0.0	0.0	15,844	0.53/354/354	4868

OPTIMUM CRUISE						
	12,000 LB REMAINING		7000 LB REMAINING		2000 LB REMAINING	
ALT 1000 FEET	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)	MACH/KIAS/KTAS	TOTAL FUEL FLOW (LB/HR)
40	---	---	---	---	---	---
35	0.85/291/490	3695	0.83/282/476	3105	0.79/268/455	2591
30	0.80/304/472	3636	0.78/297/462	3203	0.73/276/432	2694
25	0.75/315/452	3735	0.71/296/427	3208	0.69/288/416	2856
20	0.70/324/430	3818	0.67/309/411	3383	0.62/285/381	2893
10	0.60/333/383	4105	0.57/314/361	3653	0.52/285/329	3118
0	0.51/336/336	4453	0.47/313/313	3939	0.43/284/284	3371

Figure P-10. (Sheet 4)

Diversion Decision — Divert

DATA BASIS ESTIMATED **ENGINE F100-PW-229**

CONDITIONS:

- **MIL CLIMB AT 433 KIAS OR OPTIMUM ALTITUDE MACH NO., WHICHEVER IS LESS**
- **DESCEND AT IDLE, 221 KIAS**
- **STANDARD DAY**
- **NO FUEL RESERVE**
- **ZERO WIND**
- **ALL DESCENTS ARE TO SEA LEVEL**
- **DRAG INDEX = 55**

NOTES:

- 4.0% RANGE GAIN FOR 10 KTS TAILWIND.
- 2.5% RANGE LOSS FOR 10 KTS HEADWIND.
- SUBTRACT 2.5 NM FROM DESCENT DISTANCE FOR EACH 1000 FT OF DESTINATION ELEVATION.
- TOTAL DIVERT RANGE AT CURRENT ALTITUDE INCLUDES CRUISE AND DESCENT, AND TOTAL DIVERT RANGE AT OPTIMUM ALTITUDE INCLUDES CLIMB, CRUISE, AND DESCENT.

IF YOU ARE AT SEA LEVEL

FUEL ON BOARD −LB	REMAIN AT SEA LEVEL		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL DIVERT RANGE−NM		ALT/MACH	TOTAL DIVERT RANGE−NM	FROM OPT ALT −NM	FUEL USED IN DESCENT −LB
200	19		5.0K/0.46	20	16	102
400	37		15.0K/0.55	45	38	200
600	55		25.0K/0.68	77	60	267
800	72	0.43M	30.0K/0.73	110	71	298
1000	90		35.0K/0.78	146	83	330
1500	134		40.0K/0.84	241	97	367
2000	178		40.0K/0.84	337	97	367

IF YOU ARE AT 5000 FEET

FUEL ON BOARD −LB	REMAIN AT 5000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL DIVERT RANGE−NM*		ALT/MACH	TOTAL DIVERT RANGE−NM	FROM OPT ALT −NM	FUEL USED IN DESCENT −LB
200	26		5.0K/0.46	26	16	102
400	46		15.0K/0.55	51	38	200
600	66		30.0K/0.72	86	71	298
800	85	0.47M	35.0K/0.78	121	83	330
1000	105		35.0K/0.78	158	83	330
1500	155		40.0K/0.84	254	97	367
2000	204		40.0K/0.84	350	97	367

***START DESCENT AT 16 NM. 102 LB FUEL USED IN DESCENT.**

Figure P-11. (Sheet 1)

Diversion Decision — Divert

DATA BASIS ESTIMATED **ENGINE F100-PW-229**

CONDITIONS:

- **MIL CLIMB AT 433 KIAS OR OPTIMUM ALTITUDE MACH NO., WHICHEVER IS LESS**
- **DESCEND AT IDLE, 221 KIAS**
- **STANDARD DAY**
- **NO FUEL RESERVE**
- **ZERO WIND**
- **ALL DESCENTS ARE TO SEA LEVEL**
- **DRAG INDEX = 55**

NOTES:

- 4.0% RANGE GAIN FOR 10 KTS TAILWIND.
- 2.5% RANGE LOSS FOR 10 KTS HEADWIND.
- SUBTRACT 2.5 NM FROM DESCENT DISTANCE FOR EACH 1000 FT OF DESTINATION ELEVATION.
- TOTAL DIVERT RANGE AT CURRENT ALTITUDE INCLUDES CRUISE AND DESCENT, AND TOTAL DIVERT RANGE AT OPTIMUM ALTITUDE INCLUDES CLIMB, CRUISE, AND DESCENT.

IF YOU ARE AT 10,000 FEET

FUEL ON BOARD –LB	REMAIN AT 10,000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL DIVERT RANGE–NM*		ALT/MACH	TOTAL DIVERT RANGE–NM	FROM OPT ALT –NM	FUEL USED IN DESCENT –LB
200	32		10.0K/0.50	32	27	159
400	54		20.0K/0.61	59	48	233
600	77		30.0K/0.73	95	71	298
800	99	0.51M	35.0K/0.78	133	83	330
1000	121		35.0K/0.79	170	83	330
1500	177		40.0K/0.84	267	97	367
2000	232		40.0K/0.84	363	97	367

***START DESCENT AT 27 NM. 159 LB FUEL USED IN DESCENT.**

IF YOU ARE AT 20,000 FEET

FUEL ON BOARD –LB	REMAIN AT 20,000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL DIVERT RANGE–NM*		ALT/MACH	TOTAL DIVERT RANGE–NM	FROM OPT ALT –NM	FUEL USED IN DESCENT –LB
200	- - -		- - -	- - -	- - -	- - -
400	72		25.0K/0.68	75	60	267
600	100		35.0K/0.78	112	83	330
800	128	0.62M	40.0K/0.84	152	97	367
1000	156		40.0K/0.84	191	97	367
1500	225		40.0K/0.84	289	97	367
2000	294		40.0K/0.84	385	97	367

***START DESCENT AT 48 NM. 233 LB FUEL USED IN DESCENT.**

Figure P-11. (Sheet 2)

Diversion Decision — Divert

DATA BASIS ESTIMATED **ENGINE F100-PW-229**

CONDITIONS:

- **MIL CLIMB AT 433 KIAS OR OPTIMUM ALTITUDE MACH NO., WHICHEVER IS LESS**
- **DESCEND AT IDLE, 221 KIAS**
- **STANDARD DAY**
- **NO FUEL RESERVE**
- **ZERO WIND**
- **ALL DESCENTS ARE TO SEA LEVEL**
- **DRAG INDEX = 55**

NOTES:

- 4.0% RANGE GAIN FOR 10 KTS TAILWIND.
- 2.5% RANGE LOSS FOR 10 KTS HEADWIND.
- SUBTRACT 2.5 NM FROM DESCENT DISTANCE FOR EACH 1000 FT OF DESTINATION ELEVATION.
- TOTAL DIVERT RANGE AT CURRENT ALTITUDE INCLUDES CRUISE AND DESCENT, AND TOTAL DIVERT RANGE AT OPTIMUM ALTITUDE INCLUDES CLIMB, CRUISE, AND DESCENT.

IF YOU ARE AT 30,000 FEET

FUEL ON BOARD –LB	REMAIN AT 30,000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL DIVERT RANGE–NM*		ALT/MACH	TOTAL DIVERT RANGE–NM	FROM OPT ALT –NM	FUEL USED IN DESCENT –LB
200	- - -		- - -	- - -	- - -	- - -
400	89		35.0K/0.77	89	83	330
600	124		40.0K/0.84	129	97	367
800	158	0.74M	40.0K/0.84	168	97	367
1000	193		40.0K/0.84	208	97	367
1500	279		40.0K/0.84	306	97	367
2000	363		40.0K/0.84	402	97	367

***START DESCENT AT 71 NM. 298 LB FUEL USED IN DESCENT.**

IF YOU ARE AT 40,000 FEET

FUEL ON BOARD –LB	REMAIN AT 40,000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL DIVERT RANGE–NM*		ALT/MACH	TOTAL DIVERT RANGE–NM	FROM OPT ALT –NM	FUEL USED IN DESCENT –LB
200	- - -		- - -	- - -	- - -	- - -
400	104		40.0K/0.83	104	97	367
600	144		40.0K/0.84	144	97	367
800	184	0.84M	40.0K/0.84	184	97	367
1000	224		40.0K/0.84	224	97	367
1500	321		40.0K/0.84	321	97	367
2000	417		40.0K/0.84	417	97	367

***START DESCENT AT 97 NM. 367 LB FUEL USED IN DESCENT.**

Figure P-11. (Sheet 3)

Diversion Decision — Loiter

DATA BASIS ESTIMATED **ENGINE F100-PW-229**

CONDITIONS:

- **MIL CLIMB AT 433 KIAS OR OPTIMUM ALTITUDE MACH NO., WHICHEVER IS LESS**
- **DESCEND AT IDLE, 221 KIAS**
- **STANDARD DAY**
- **NO FUEL RESERVE**
- **ZERO WIND**
- **ALL DESCENTS ARE TO SEA LEVEL**
- **DRAG INDEX = 55**

NOTES:

- LOITER TIME AT CONSTANT ALTITUDE BASED ON 10 NM HOLDING PATTERN WITH 30-DEGREE BANK TURNS.
- ADD 0.5 MIN TO LOITER TIME FOR EACH 1000 FT OF DESTINATION ELEVATION.
- SUBTRACT 2.3 NM FROM DESCENT DISTANCE FOR EACH 1000 FT OF DESTINATION ELEVATION.
- TOTAL LOITER TIME AT CURRENT ALTITUDE INCLUDES LOITER AND DESCENT, AND TOTAL TIME AT OPTIMUM ALTITUDE INCLUDES CLIMB, LOITER, AND DESCENT.

IF YOU ARE AT SEA LEVEL

FUEL ON BOARD −LB	REMAIN AT SEA LEVEL TOTAL LOITER TIME−MIN		CLIMB TO OPT ALTITUDE ALT/MACH	CLIMB TO OPT ALTITUDE TOTAL TIME−MIN	DESCEND FROM OPT ALT −NM	DESCEND FUEL USED IN DESCENT −LB
200	- - -		- - -	- - -	- - -	- - -
400	9		0.0K/0.32	9	0	0
600	13		5.0K/0.35	13	12	84
800	17	0.32M	20.0K/0.47	19	44	222
1000	21		30.0K/0.55	25	65	285
1500	31		35.0K/0.67	38	79	320
2000	41		35.0K/0.67	49	79	320

IF YOU ARE 5000 FEET

FUEL ON BOARD −LB	REMAIN AT 5000 FT TOTAL LOITER TIME−MIN*		CLIMB TO OPT ALTITUDE ALT/MACH	CLIMB TO OPT ALTITUDE TOTAL TIME−MIN	DESCEND FROM OPT ALT −NM	DESCEND FUEL USED IN DESCENT −LB
200	- - -		- - -	- - -	- - -	- - -
400	- - -		- - -	- - -	- - -	- - -
600	15		10.0K/0.39	15	24	145
800	19	0.36M	20.0K/0.47	21	44	222
1000	23		35.0K/0.67	27	79	320
1500	34		35.0K/0.67	39	79	320
2000	44		35.0K/0.67	51	79	320

*** START DESCENT AT 12 NM. 84 LB FUEL USED IN DESCENT.**

Figure P-12. (Sheet 1)

Diversion Decision — Loiter

DATA BASIS ESTIMATED **ENGINE F100-PW-229**

CONDITIONS:

- **MIL CLIMB AT 433 KIAS OR OPTIMUM ALTITUDE MACH NO., WHICHEVER IS LESS**
- **DESCEND AT IDLE, 221 KIAS**
- **STANDARD DAY**
- **NO FUEL RESERVE**
- **ZERO WIND**
- **ALL DESCENTS ARE TO SEA LEVEL**
- **DRAG INDEX = 55**

NOTES:

- LOITER TIME AT CONSTANT ALTITUDE BASED ON 10 NM HOLDING PATTERN WITH 30-DEGREE BANK TURNS.
- ADD 0.5 MIN TO LOITER TIME FOR EACH 1000 FT OF DESTINATION ELEVATION.
- SUBTRACT 2.3 NM FROM DESCENT DISTANCE FOR EACH 1000 FT OF DESTINATION ELEVATION.
- TOTAL LOITER TIME AT CURRENT ALTITUDE INCLUDES LOITER AND DESCENT, AND TOTAL TIME AT OPTIMUM ALTITUDE INCLUDES CLIMB, LOITER, AND DESCENT.

IF YOU ARE AT 10,000 FEET

FUEL ON BOARD −LB	REMAIN AT 10,000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL LOITER TIME−MIN*		ALT/MACH	TOTAL TIME−MIN	FROM OPT ALT −NM	FUEL USED IN DESCENT −LB
200	- - -		- - -	- - -	- - -	- - -
400	- - -		- - -	- - -	- - -	- - -
600	17		15.0K/0.43	17	34	188
800	21	0.39M	25.0K/0.51	23	54	253
1000	25		35.0K/0.67	28	79	320
1500	36		35.0K/0.67	40	79	320
2000	47		35.0K/0.67	52	79	320

*** START DESCENT AT 24 NM. 145 LB FUEL USED IN DESCENT.**

IF YOU ARE AT 20,000 FEET

FUEL ON BOARD −LB	REMAIN AT 20,000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL LOITER TIME−MIN*		ALT/MACH	TOTAL TIME−MIN	FROM OPT ALT −NM	FUEL USED IN DESCENT −LB
200	- - -		- - -	- - -	- - -	- - -
400	- - -		- - -	- - -	- - -	- - -
600	20		20.0K/0.47	20	44	222
800	24	0.48M	30.0K/0.55	25	65	285
1000	29		35.0K/0.67	31	79	320
1500	40		35.0K/0.67	42	79	320
2000	51		35.0K/0.67	54	79	320

*** START DESCENT AT 44 NM. 222 LB FUEL USED IN DESCENT.**

Figure P-12. (Sheet 2)

Diversion Decision — Loiter

DATA BASIS ESTIMATED **ENGINE F100-PW-229**

CONDITIONS:

- **MIL CLIMB AT 433 KIAS OR OPTIMUM ALTITUDE MACH NO., WHICHEVER IS LESS**
- **DESCEND AT IDLE, 221 KIAS**
- **STANDARD DAY**
- **NO FUEL RESERVE**
- **ZERO WIND**
- **ALL DESCENTS ARE TO SEA LEVEL**
- **DRAG INDEX = 55**

NOTES:

- LOITER TIME AT CONSTANT ALTITUDE BASED ON 10 NM HOLDING PATTERN WITH 30-DEGREE BANK TURNS.
- ADD 0.5 MIN TO LOITER TIME FOR EACH 1000 FT OF DESTINATION ELEVATION.
- SUBTRACT 2.3 NM FROM DESCENT DISTANCE FOR EACH 1000 FT OF DESTINATION ELEVATION.
- TOTAL LOITER TIME AT CURRENT ALTITUDE INCLUDES LOITER AND DESCENT, AND TOTAL TIME AT OPTIMUM ALTITUDE INCLUDES CLIMB, LOITER, AND DESCENT.

IF YOU ARE AT 30,000 FEET

FUEL ON BOARD –LB	REMAIN AT 30,000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL LOITER TIME–MIN*		ALT/MACH	TOTAL TIME–MIN	FROM OPT ALT –NM	FUEL USED IN DESCENT –LB
200	- - -		- - -	- - -	- - -	- - -
400	- - -		- - -	- - -	- - -	- - -
600	23		30.0K/0.55	23	65	285
800	27	0.55M	35.0K/0.67	28	79	320
1000	32		35.0K/0.67	33	79	320
1500	44		35.0K/0.67	44	79	320
2000	55		35.0K/0.67	55	79	320

*** START DESCENT AT 65 NM. 285 LB FUEL USED IN DESCENT.**

IF YOU ARE AT 40,000 FEET

FUEL ON BOARD –LB	REMAIN AT 40,000 FT		CLIMB TO OPT ALTITUDE		DESCEND	
	TOTAL LOITER TIME–MIN*		ALT/MACH	TOTAL TIME–MIN	FROM OPT ALT –NM	FUEL USED IN DESCENT –LB
200	- - -		- - -	- - -	- - -	- - -
400	- - -		- - -	- - -	- - -	- - -
600	- - -		- - -	- - -	- - -	- - -
800	29	0.75M	40.0K/0.75	29	93	356
1000	34		40.0K/0.75	34	93	356
1500	45		40.0K/0.75	45	93	356
2000	55		40.0K/0.75	55	93	356

*** START DESCENT AT 93 NM. 356 LB FUEL USED IN DESCENT.**

Figure P-12. (Sheet 3)

Best Cruise Altitude for Short Range Mission — Maximum Range Descent

DATA BASIS ESTIMATED **ENGINE F100-PW-229**

CONDITIONS:

- **STANDARD DAY**
- **NO WIND**
- **MIL CLIMB AT SCHEDULED KIAS OR CONSTANT ALTITUDE OPTIMUM CRUISE MACH NO., WHICHEVER IS LOWER**
- **CRUISE AT CONSTANT ALTITUDE AT OPTIMUM MACH**
- **DESCEND AT IDLE WITH SPEEDBRAKES CLOSED**
- **DRAG INDEX/DESCENT SPEED KIAS = 0/215, 50/220, AND ≥ 100/230**

ST CL GW*	TOT MSN RG**	BEST CR ALT	TOTAL FUEL CONSUMED (LB)/DESCENT RANGE (NM)		
LB– 1000	NM	FT– 1000	DI 0	DI 100	DI 200
20.0	50	14.6	401/46	449/32	504/25
20.0	100	30.3	670/87	731/62	828/49
20.0	150	35.9	895/108	987/74	1131/59
20.0	200	41.6	1101/132	1237/89	1444/70
20.0	250	41.8	1295/134	1473/90	1721/70
24.0	50	15.7	414/45	465/35	529/28
24.0	100	29.4	719/78	802/61	917/50
24.0	150	34.6	969/93	1097/73	1277/60
24.0	200	36.3	1199/98	1380/76	1600/63
24.0	250	36.7	1426/100	1656/77	1925/64
28.0	50	16.8	432/43	489/36	559/30
28.0	100	27.1	776/66	878/55	1011/47
28.0	150	32.2	1056/77	1220/66	1418/56
28.0	200	35.0	1320/84	1535/72	1801/61
28.0	250	35.6	1570/86	1845/73	2167/63
32.0	50	15.8	463/38	526/32	605/28
32.0	100	24.8	839/55	958/49	1110/43
32.0	150	30.0	1152/65	1345/59	1566/52
32.0	200	32.7	1449/71	1695/64	2002/57
32.0	250	34.0	1736/74	2045/67	2409/59

*** CLIMB BEGINS AT SL.**
**** CLIMB/CRUISE/DESCENT.**

Figure P-13. (Sheet 1)

Best Cruise Altitude for Short Range Mission — Maximum Range Descent

DATA BASIS ESTIMATED **ENGINE F100-PW-229**

CONDITIONS:

- STANDARD DAY
- NO WIND
- MIL CLIMB AT SCHEDULED KIAS OR CONSTANT ALTITUDE OPTIMUM CRUISE MACH NO., WHICHEVER IS LOWER
- CRUISE AT CONSTANT ALTITUDE AT OPTIMUM MACH
- DESCEND AT IDLE WITH SPEEDBRAKES CLOSED
- DRAG INDEX/DESCENT SPEED KIAS = 0/215, 50/220, AND ≥ 100/230

ST CL GW*	TOT MSN RG**	BEST CR ALT	TOTAL FUEL CONSUMED (LB)/DESCENT RANGE (NM)		
LB–1000	NM	FT–1000	DI 0	DI 100	DI 200
36.0	50	13.7	493/32	567/28	655/24
36.0	100	21.9	905/45	1043/41	1213/37
36.0	150	28.3	1258/56	1471/53	1724/47
36.0	200	30.5	1585/61	1864/57	2205/51
36.0	250	31.5	1907/63	2257/59	2660/53
40.0	50	11.7	523/27	609/23	704/21
40.0	100	20.3	973/39	1130/37	1316/33
40.0	150	26.0	1360/48	1602/47	1878/42
40.0	200	28.4	1731/52	2045/51	2410/46
40.0	250	29.2	2084/54	2474/52	2916/47
44.0	50	8.4	550/21	652/17	754/16
44.0	100	18.9	1043/34	1221/32	1422/30
44.0	150	24.1	1468/42	1737/41	2037/37
44.0	200	26.0	1866/45	2223/44	2617/41
44.0	250	27.1	2259/46	2696/46	3182/42
48.0	50	6.3	572/18	687/14	802/12
48.0	100	16.6	1113/30	1312/28	1533/25
48.0	150	21.4	1575/36	1875/35	2197/32
48.0	200	23.8	2005/39	2402/39	2835/35
48.0	250	25.4	2433/40	2925/41	3454/38
52.0	50	4.4	595/15	722/11	847/10
52.0	100	14.2	1182/25	1402/23	1643/22
52.0	150	19.8	1677/32	2010/31	2356/28
52.0	200	22.3	2145/34	2583/34	3056/31
52.0	250	23.3	2605/35	3154/36	

*** CLIMB BEGINS AT SL.**
**** CLIMB/CRUISE/DESCENT.**

Figure P-13. (Sheet 2)

Ambient Air Temperature

ALTITUDE —1000 FT	STD TEMP	
	°C	°F
SL	15	59
5	5	41
10	–5	23
15	–15	6
20	–25	–12
25	–35	–30
30	–44	–48
35	–54	–66
40	–56	–70
45	–56	–70
50	–56	–70
55	–56	–70
60	–56	–70

°F = (9/5 °C) + 32°
°C = 5/9(°F – 32°)

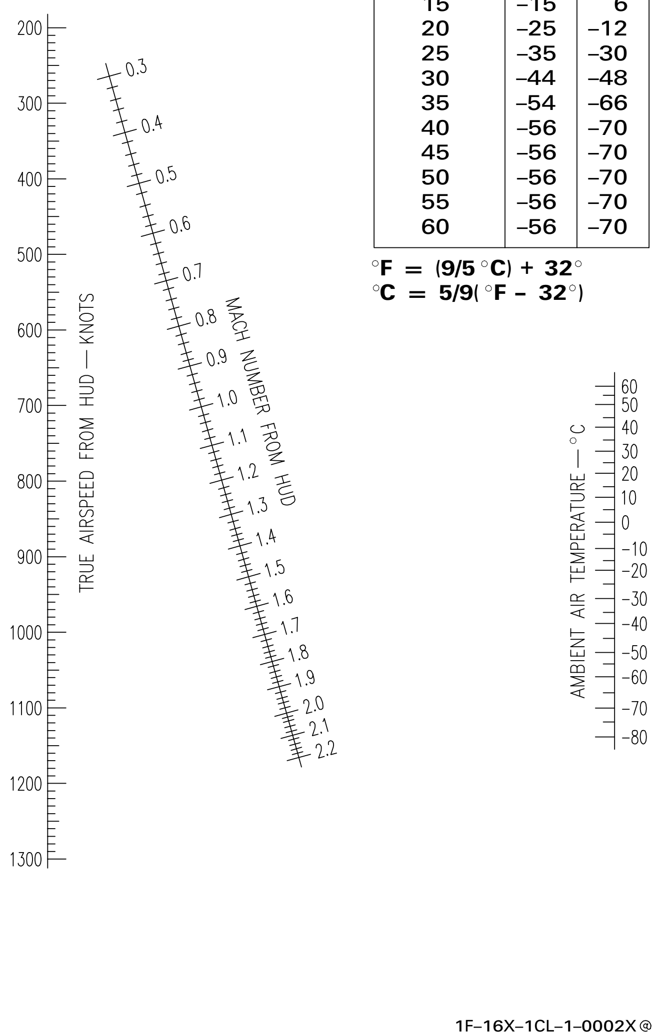


Figure P-14.

SECTION EP

EMERGENCY PROCEDURES

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LANDING EMERGENCIES

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Pilot Fault List — Engine

FAULT	CAUSE	CORRECTIVE ACTION/REMARKS
ENG A/B FAIL and ENG THST LOW	Engine hardware deterioration/detected performance loss	Reduce engine rpm to 85% or less, unless required to sustain flight. High thrust levels may result in further deterioration/performance loss. Land as soon as possible
ENG A/I TEMP	Anti-ice valve failed open and/or bleed air temperature greater than 850°F	Reduce throttle setting to midrange unless required to sustain flight. Operating the engine above midrange with anti-ice system failed on may result in engine stall. Land as soon as practical
ENG A/I FAIL	Engine anti-ice valve failed in closed position	Avoid areas of known or suspected icing conditions
ENG MACH FAIL	The CADC supplied mach number to the DEEC is no longer available	Supersonic stall protection is inoperative. Do not retard throttle below MIL while supersonic. If CADC caution light is also on, refer to CADC MALFUNCTION, page B-7
ENG A/B FAIL	AB system failure detected	AB RESET sw – AB RESET. Land as soon as practical if fault does not clear. AB operation is partially or fully inhibited
ENG THST LOW	Loss of redundant FTIT signals received by DEEC	MIL rpm is reduced 7 percent by DEEC. Land as soon as practical
	DEEC has detected a failed open or missing nozzle	If a failed open or missing nozzle is suspected, refer to NOZZLE FAILURE, page C-25

Pilot Fault List — Engine

FAULT	CAUSE	CORRECTIVE ACTION/REMARKS
ENG BUS FAIL	Communication lost between EDU and MUX bus	Illuminates AVIONICS FAULT caution light. A subsequent engine fault causes a nonre-settable ENGINE FAULT caution light and is not displayed on the PFLD
ENG PFL DGRD	Communication lost between EDU and DEEC	Do not retard throttle below MIL while supersonic. Only ENG A/I TEMP PFL can subsequently be displayed

NOTE:

A short duration fault condition may cause display of a PFL without illumination of the ENGINE FAULT caution light.

Pilot Fault List — FLCS

(FLCS warning light illuminated)

FAULT	CAUSE	CORRECTIVE ACTION/REMARKS
FLCS AOA WARN	Dual AOA failure	Refer to AOA MALFUNCTION, page B-5
FLCS DUAL FAIL	Dual electronic, sensor, or power failure in one or more axes	Refer to FLCS DUAL ELECTRONIC FAILURE, page B-15
FLCS LEF LOCK	LEF's are locked due to multiple failures, LE FLAPS switch position, or asymmetry	Refer to LEF MALFUNCTION, page B-11 and B-13
STBY GAIN	Dual air data failure	Refer to AIR DATA MALFUNCTIONS, page B-9
FLCS BIT FAIL	FLCS BIT has detected a failure	Perform a second FLCS BIT. If fault does not clear, notify maintenance. Fault only occurs on ground

Pilot Fault List — FLCS

(TF FAIL warning light illuminated)

FAULT	CAUSE	CORRECTIVE ACTION/REMARKS
SWIM NVP FAIL	NVP data bad, AMUX wraparound failure, NVP self-mode failure, or cyclic test problem monitor failure	Refer to TF FAIL WARNING LIGHT, Page B-21
SWIM RALT FAIL	SDC monitor failure or CARA data bad	
SWIM SCP FAIL	Below set clearance failure	
SWIM ATTD FAIL	INS attitude estimator failure	
SWIM ATF FAIL	NVP ATF select failure	
SWIM VEL FAIL	GPS/INS failure	

Pilot Fault List — FLCS

(FLCS FAULT caution light illuminated for all)

FAULT	CAUSE	CORRECTIVE ACTION/REMARKS
FLCS ADC FAIL	First failure of triplex air data input signal	Refer to AIR DATA MALFUNCTIONS, page B-9
FLCS AOA FAIL	First failure of triplex AOA input signal	Refer to AOA MALFUNCTION, page B-5
FLCS AOS FAIL	AOS feedback function is inoperative due to failure	Perform FLCS reset to attempt to clear fault; fault cannot be reset if INS or CADC is failed If fault does not clear, the autopilot cannot be engaged. Position the STORES CONFIG sw to CAT III if the aircraft is configured with a (33) GP/STORE/LINE loading*
FLCS FLUP OFF	MANUAL TF FLYUP sw moved to DISABLE	Position the MANUAL TF FLYUP sw as required. A FLCS reset extinguishes FLCS FAULT caution light
	FLCS BIT detects MANUAL TF FLYUP sw in DISABLE	Position MANUAL TF FLYUP sw to ENABLE. Rerun FLCS BIT
FLCS A/P DEGR	Autopilot operating outside of attitude limits or unable to hold commanded mode	Autopilot is inoperative

NOTE:

*The potential for a departure from controlled flight is significantly increased if the AOS feedback function is inoperative and maneuvering with (33) GP/STORE/LINE loadings occurs with the STORES CONFIG sw in CAT I.

Pilot Fault List — FLCS

(FLCS FAULT caution light illuminated for all except FLCS BUS FAIL)

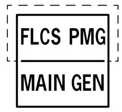
FAULT	CAUSE	CORRECTIVE ACTION/REMARKS
FLCS A/P FAIL	Autopilot has disconnected or cannot be engaged due to loss of needed data	Autopilot is inoperative
FLCS BUS FAIL	Communication lost between FLCC and MUX bus	Illuminates AVIONICS FAULT caution light. Other FLCS PFL's may not be displayed on the PFLD. Refer to FLCS page on MFD for FLCS PFL's
BRK PWR DEGR	Power supply failure detected in one or more branches	Refer to FLCS SINGLE ELECTRONIC FAILURE, page B-15
FLCS CCM FAIL	Erroneous output command detected by CCM	Refer to FLCS SINGLE ELECTRONIC FAILURE, page B-15
FLCS HOT TEMP	FLCC sensors detect two branches in excess of 75°C	Refer to FLCS TEMPERATURE MALFUNCTIONS, page B-13
ISA ALL FAIL	Two or more ISA's have reported a first servo valve failure	Refer to SERVO MALFUNCTION, page B-17

Pilot Fault List — FLCS

(FLCS FAULT caution light illuminated for all)

FAULT	CAUSE	CORRECTIVE ACTION/REMARKS
ISA LHT FAIL ISA RHT FAIL ISA LF FAIL ISA RF FAIL ISA RUD FAIL	Indicated ISA has reported a first servo valve failure	Refer to SERVO MALFUNCTION, page B-17
FLCS SNGL FAIL	Indicates single electronic or sensor failure in one or more axes	Notify maintenance. Fault only occurs on ground
FLCS MUX DEGR	BIT detected degradation of FLCC MUX interface	FLCS reset will not clear fault. Perform a second FLCS BIT. If fault does not clear and no other faults are reported, the system redundancy is adequate for flight. Notify maintenance after flight. Fault only occurs on ground

GLOSSARY



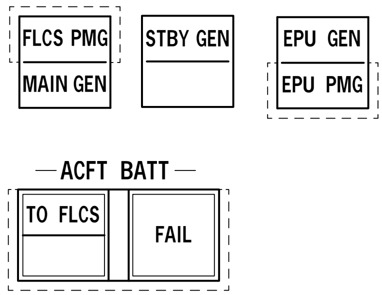
Dash line indicates light may be on or off

ELEC
A

Electrical System Failures

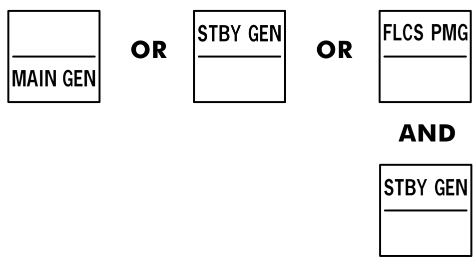
PARTIAL ELECTRICAL POWER LOSS A-7

ELEC SYS	**Refer to ELEC control panel.**
— ACFT BATT — FAIL	**ACFT BATTERY FAILURE A-9**
FLCS RLY	**FLCS RLY LIGHT A-11**
HYDRAZN / AIR AND EPU RUN LIGHT OFF OR FLASHING	**EPU MALFUNCTIONS A-17**
FLCS PMG	**FLCS PMG FAILURE A-9**
MAIN GEN AND STBY GEN	**MAIN AND STANDBY GENERATOR FAILURE** (GROUND) .... A-5 (IN FLIGHT) A-15



AND EPU RUN LIGHT OFF

MAIN, STANDBY, AND EPU GENERATOR FAILURE A-13
PTO SHAFT FAILURE .... GO TO TAB D



SINGLE GENERATOR FAILURE (IN FLIGHT) A-11

EMERGENCY POWER DISTRIBUTION A-19

OTHER CONSIDERATIONS:

1 Turn EPU on, if required, to obtain NWS.

2 C If chocks are not installed, be prepared to immediately engage the parking brake if it disengages when the EPU is shut off.

3 Toe brakes and parking brake are available with or without the EPU as long as the MAIN PWR sw is not moved to OFF.

4 C If main or standby generator cannot be reset, NWS is inoperative unless the EPU is activated.

MAIN AND STANDBY GENERATOR FAILURE (GROUND)

If MAIN GEN and STBY GEN lights illuminate:

1. Stop the aircraft. [1]
2. ANTI-SKID sw – PARKING BRAKE.
3. OXYGEN – 100%.
4. EPU sw – OFF. [2][C]

If further taxiing is required:

5. ELEC CAUTION RESET button – Depress. [3] [4][C]
6. Refer to ACTIVATED EPU/HYDRAZINE LEAK, page F-13.

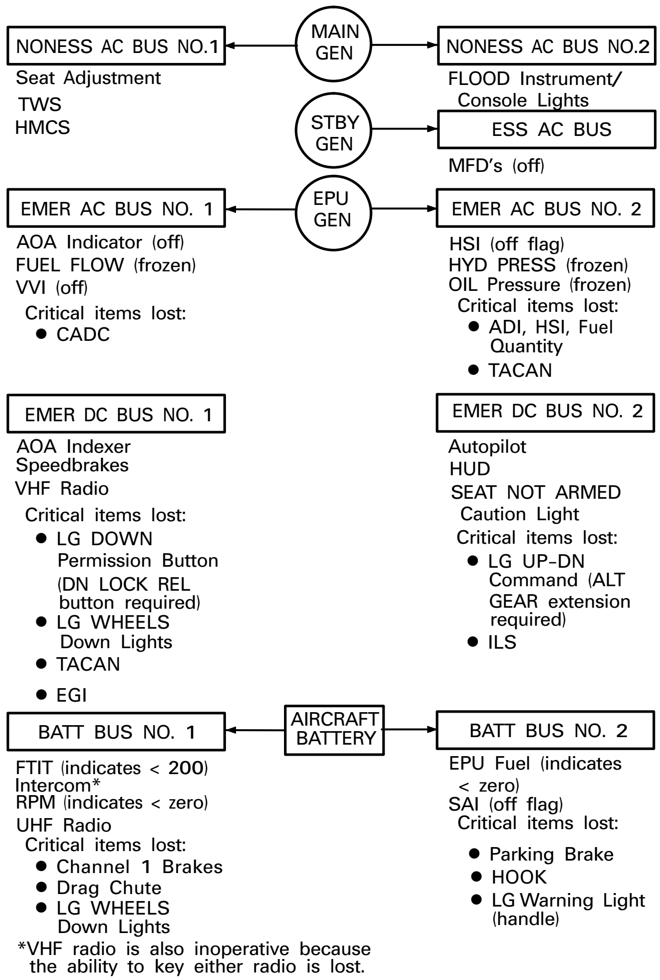
END

7 1/4 ″ Page

OTHER CONSIDERATIONS:

1 The failed open OCSC may reset.

2 Refer to the following diagram to determine the power status of individual buses. If one item on a bus is powered, then that bus should be considered powered.



3 Determining the status of the battery buses is critical for a safe recovery of the aircraft.

7 1/4 " Page

PARTIAL ELECTRICAL POWER LOSS

1. ELEC CAUTION RESET button – Depress. [1]

If power is restored:

2. Land as soon as practical.

If power is not restored:

2. Determine the power status of electrical buses. [2] [3]

(Cont)

7 1/2 ″ Page

OTHER CONSIDERATIONS:

4 ● The nonessential dc buses and essential dc bus lose power. This results in loss of power to fuel boost and transfer pumps, CARA, ECM, and FCR and power for normal weapon arming/release including selective jettison.

● If the affected systems are required for the safe recovery of the aircraft, consider delaying/terminating EPU operation until the systems are no longer required.

5 If power to the battery buses is lost after the landing gear has been extended, the landing gear cannot be raised.

7 1/2 ″ Page

If one or both emergency ac buses are not powered:

3. EPU sw – ON. 4

If the battery buses and emergency dc bus No. 2 are not powered:

4. Consider a net arrestment, refer to NET ARRESTMENT, page F-11.

If net arrestment is not available:

5. Consider a gear up landing, refer to LANDING WITH LG UNSAFE/UP, page E-15. 5
6. Refer to EMERGENCY POWER DISTRIBUTION, page A-19.
7. Land as soon as possible.

If EPU was activated:

8. Refer to ACTIVATED EPU/HYDRAZINE LEAK, page F-13.

END

7 3/8 ″ Page

OTHER CONSIDERATIONS:

1 C If the aircraft battery fails (and EPU is off), do not taxi except to clear runway. Subsequent loss of the main and standby generators results in loss of all braking, NWS, hook, and radios.

2 ● The nonessential dc buses and essential dc bus lose power. This results in loss of power to fuel boost and transfer pumps, CARA, ECM, and FCR and power for normal weapon arming/release including selective jettison.

● If the affected systems are required for the safe recovery of the aircraft, consider delaying/terminating EPU operation until the systems are no longer required.

● If both radios become inoperative after an aircraft battery failure indication, refer to PARTIAL ELECTRICAL POWER LOSS, page A-7.

● The ACFT BATT FAIL light may subsequently extinguish. This should not be interpreted to mean that the battery has recharged. It may indicate that the battery voltage is so low that the light cannot remain illuminated.

AIRCRAFT BATTERY FAILURE 1 C

1. EPU sw – ON. 2
2. Land as soon as practical.
3. Refer to ACTIVATED EPU/HYDRAZINE LEAK, page F-13.

If EPU runs abnormally:

4. EPU sw – OFF, then NORM.
5. Land as soon as possible.
6. Refer to ACTIVATED EPU/HYDRAZINE LEAK, page F-13.

Prior to shutdown:

7. Loose items – Secure.
8. Canopy – Open.

FLCS PMG FAILURE

If FLCS PMG light illuminates:

1. Land as soon as practical.

END

7 3/4 ″ Page

OTHER CONSIDERATIONS:

1 C Illumination of the MAIN GEN light after a 2-3 second loss of power to the HUD, MFD’s, and other cockpit instruments indicates shorting failure of an OCSC or other wiring/equipment.

2 With standby generator failure and the MAL & IND LTS sw in DIM, the ELEC SYS caution light may not appear to illuminate when the MASTER CAUTION and STBY GEN lights illuminate.

3 This action may reset the main or standby generator. Cycling the MAIN PWR sw may also reset the main generator; however, this action momentarily removes standby generator power and activates the EPU.

4 ● The nonessential dc buses and essential dc bus lose power. This results in loss of power to fuel boost and transfer pumps, CARA, ECM, and FCR and power for normal weapon arming/release including selective jettison.

● If the affected systems are required for the safe recovery of the aircraft, consider delaying/terminating EPU operation until the systems are no longer required.

SINGLE GENERATOR FAILURES (IN FLIGHT) 1C 2

If MAIN GEN light illuminated after a 2-3 second loss of the HUD and MFD's was observed:

1. Land as soon as practical.

If MAIN GEN light illuminated and a 2-3 second loss of the HUD and MFD's was not observed, or if STBY GEN or STBY GEN and FLCS PMG lights illuminate:

1. ELEC CAUTION RESET button – Depress. 3
2. Land as soon as practical.

FLCS RLY Light

1. FLCS PWR TEST sw – TEST, momentarily.

If FLCS RLY light goes off:

2. Land as soon as practical.

If FLCS RLY light remains on:

2. EPU sw – ON. 4
3. Land as soon as practical.
4. Refer to ACTIVATED EPU/HYDRAZINE LEAK, page F-13.

If EPU runs abnormally:

3. EPU sw – OFF, then NORM.
4. Land as soon as possible.

END

OTHER INDICATIONS:

Main, standby, and EPU generators inoperative:

- Avionics inoperative.
- Uncontrollable cold airflow into the cockpit or reduced airflow to the cockpit if the water separator coalescer freezes up.
- ADI AUX warning flag.
- ADI OFF warning flag.

MAJOR INOPERATIVE EQUIPMENT:

Main, standby, and EPU generators inoperative:

- Normal LG extension.
- LEF's, speedbrakes, stick trim.
- FUEL quantity/FUEL FLOW indicators.
- Fuel boost and transfer pumps.
- Stores jettison (SEL and EMER).
- ADI, AOA, IFF, INS, TACAN, and VHF.
- Go to EMERGENCY POWER DISTRIBUTION, page A-19, for other systems lost.

OTHER CONSIDERATIONS:

1 W With a main, standby, and EPU generator failure, OBOGS and the OXY LOW warning light are inoperative. Activate EOS if above 10,000 ft cockpit altitude.

2 W LEF's are inoperative and departure susceptibility may be increased. Near 1g flight, 200 kts should keep AOA less than 12°. Limit rolling maneuvers to a max bank angle change of 90° and avoid rapid roll rates.

3 This action may reset the main and/or standby generator.

4 This action may reset the main generator.

MAIN, STANDBY, AND EPU GENERATOR FAILURE

If MAIN GEN, STBY GEN, and EPU GEN lights illuminate: 1W

1. AOA – 12° max (200 kts min). 2W
2. EPU sw – ON (if EPU run light is off).
3. Climb if necessary.
4. Throttle – As required to extinguish the HYDRAZN light.

If EPU GEN light goes off:

5. Go to MAIN AND STANDBY GENERATOR FAILURE (IN FLIGHT), page A-15.

If EPU GEN light is still on:

6. ELEC CAUTION RESET button – Depress. 3

If both MAIN GEN and STBY GEN lights remain on:

7. MAIN PWR sw – BATT, then MAIN PWR. 4

(Cont)

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OTHER CONSIDERATIONS:

5 W ● Plan to land within 30 minutes to insure adequate electrical power for communications, brakes, hook, and drag chute.

● If the FLCS PMG and EPU PMG lights are on in combination with the ACFT BATT TO FLCS light, the aircraft battery is powering the FLCS. With the aircraft battery powering the FLCS in addition to the battery buses, approx 3-14 minutes flight time is available.

● When the FLCS is powered by aircraft battery, remain alert for degraded flight controls. At the first indication of degraded response, reduce airspeed and climb to safe ejection altitude. Eject prior to complete loss of control.

6 Fly airspeed for 11° AOA approach using fuel state when power was lost.

7 W If LG handle does not lower, select BRAKES CHAN 2 and position ALT FLAPS sw to EXTEND. Nozzle remains closed, resulting in higher than normal landing thrust.

8 • Alternate LG extension can be used up to 300 kts; however, the NLG may not fully extend until 190 kts. Time above 190 kts should be minimized in case there is a leak in the pneumatic lines.

• WHEELS down lights and TO/LDG CONFIG warning light function are inoperative. Monitor LG handle warning light to verify that LG is down.

9 C ● NWS is not available following alternate LG extension.

● Do not depress the ALT GEAR reset button while pulling the ALT GEAR handle. This action may preclude successful LG extension.

● Pulling the ALT GEAR handle with normal system B hydraulic pressure may result in system B hydraulic failure within 15 minutes.

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If either MAIN GEN or STBY GEN light goes off:

8. EPU sw – OFF, then NORM.
9. Land as soon as possible.
10. Refer to ACTIVATED EPU/HYDRAZINE LEAK, page F-13.

END

If MAIN GEN, STBY GEN, and EPU GEN lights all remain on or all come on again: 5 W

8. HOOK sw – DN.
9. C & I knob – BACK-UP.
10. Minimize UHF transmissions.

If conditions permit:

11. Land as soon as possible. 6
12. LG handle – DN. (Use DN LOCK REL button.) 7 W
13. ALT GEAR handle – Pull (190 kts max). 8 9 C
14. Consider an approach-end arrestment, if conditions permit. Refer to CABLE ARRESTMENT, page F-11.
15. Refer to ACTIVATED EPU/HYDRAZINE LEAK, page F-13.

After landing:

16. Stop straight ahead and have chocks installed (or engage parking brake).
17. MAIN PWR sw – MAIN PWR (until chocks are installed).

END

MAJOR INOPERATIVE EQUIPMENT:

- Fuel boost and transfer pumps.
- Go to EMERGENCY POWER DISTRIBUTION, page A-19, for other systems lost.

OTHER INDICATIONS:

- Numerous caution lights.
- Caution lights come on bright, if dimmed.

OTHER CONSIDERATIONS:

[1] This action may reset the main and/or standby generator. The MAIN PWR sw may also be cycled to reset the main generator.

[2] If warning flag(s) is in view, refer to EGI FAILURE, page F-29.

[3][C] If chocks are not installed, be prepared to immediately engage the parking brake if it disengages when the EPU is shut off.

MAIN AND STANDBY GENERATOR FAILURE (IN FLIGHT)

If MAIN GEN and STBY GEN lights illuminate:

1. EPU sw – ON (if EPU run light is off).
2. ELEC CAUTION RESET button – Depress. [1]

If MAIN GEN or STBY GEN light goes off:

3. EPU sw – OFF, then NORM.
4. ADI – Check for presence of OFF and/or AUX warning flags.
5. Land as soon as practical.
6. Refer to ACTIVATED EPU/HYDRAZINE LEAK, page F-13.

END

If MAIN GEN and STBY GEN lights remain on:

3. ADI – Check for presence of OFF and/or AUX warning flags. [2]
4. Land as soon as possible.
5. Refer to ACTIVATED EPU/HYDRAZINE LEAK, page F-13.
6. If hydrazine depletes or EPU run light goes off at low thrust – Go to ABNORMAL EPU OPERATION, page A-17.

After landing and aircraft is stopped:

7. Chocks – Installed (or parking brake engaged).
8. EPU sw – OFF. [3][C]
9. MAIN PWR sw – MAIN PWR (until chocks are installed).

END

OTHER CONSIDERATIONS:

[1] The nonessential dc buses and essential dc bus may lose power. If so, this results in loss of power to fuel boost and transfer pumps, CARA, ECM, and FCR and power for normal weapon arming/release including selective jettison.

[2] Only if required to maintain low thrust.

[3] ● The nonessential dc buses and essential dc bus lose power. This results in loss of power to fuel boost and transfer pumps, CARA, ECM, and FCR and power for normal weapon arming/release including selective jettison.

● If the affected systems are required for the safe recovery of the aircraft, consider delaying/terminating EPU operation until the systems are no longer required.

[4] Keep thrust high enough to assure adequate bleed air if EPU fuel usage continues above 80 percent rpm or if EPU run light is flashing. If EPU fuel is depleted or if EPU run light goes off at low thrust, set throttle to keep EPU run light on.

[5] Make an approach-end arrestment, if practical, if EPU fuel depletes before landing or if EPU run light goes off at low thrust settings. Refer to CABLE ARRESTMENT, page F-11.

[6][W] If PTO shaft or both hydraulic systems are failed, underspeed of the EPU results in loss of control. Do not retard throttle completely to IDLE until after touchdown.

[7][C] If EPU underspeeds, electrical bus cycling may affect brake operation. For a missed engagement, attempt CHAN 1 then CHAN 2 brakes. If no braking is available, consider going around for another engagement or making a departure-end arrestment. The parking brake still operates.

EPU MALFUNCTIONS

Uncommanded EPU Operation

If uncommanded EPU operation on bleed air is suspected: [1]

1. Throttle – Min practical thrust.
2. Stores – Jettison (if required). [2]
3. Land as soon as possible.

If EPU is running with normal indications: [3]

4. EPU – Leave running.
5. Land as soon as possible.
6. Refer to ACTIVATED EPU/HYDRAZINE LEAK, page F-13.

Abnormal EPU Operation

If EPU was turned on for an ACFT BATT FAIL or an FLCS RLY light:

1. EPU sw – OFF, then NORM.
2. Land as soon as possible.
3. Refer to ACTIVATED EPU/HYDRAZINE LEAK, page F-13.

If EPU was activated for other reasons:

1. Throttle – As required (75-80 percent rpm). [4]
2. EPU FUEL quantity – Monitor.
3. Land as soon as possible. [5] [6][W] [7][C]
4. Refer to ACTIVATED EPU/HYDRAZINE LEAK, page F-13.

END

NOTES:

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Emergency Power Distribution

MAIN GENERATOR FAILED

SYSTEM	INOPERATIVE EQUIPMENT	BUS ASSIGNMENT			
		NONESS AC		NACELLE NONESS DC	
		NO. 1	NO. 2	NO. 1	NO. 2
FUEL	Pumps 1,2,4 & 5		X	*	
	CFT Pumps		X		
STORES MGT	AIM–120	***			
	Stations 3, 5 & 7 – EO, Radar–Guided Weapons, ECM Pods	**			
	Stations 4 & 6 – EO, Radar–Guided Weapons		X		
AVIONICS	DTU		X		
	FCR	Radar		*	
	TWS	X		X	
LIGHTS	Flood Console		X		
	Flood Instrument		X		
	Formation		X		
	Taxi		X		
Other	D ASIU			*	
	ECM Control			*	
	Halon Heater		X		
	HMCS	X			
	Inlet Strut Heater		X		
	Nacelle Ejector Shutoff				X
	Seat Adjustment	X			
	Total Temperature Probe Heater	X			
NOTE: Equipment on nonessential ac bus No. 1 or nonessential ac bus No. 2 may be functional with the MAIN GEN light on (bus contactor failure).					

*Aft equipment bay nonessential dc bus.
**Overcurrent sensing contactors.
***Nacelle nonessential ac bus.

Emergency Power Distribution

MAIN AND STANDBY GENERATORS FAILED
(All equipment from page A-19 plus the following:)

SYSTEM	INOPERATIVE EQUIPMENT	BUS ASSIGNMENT	
		ESS AC	ESS DC
FUEL	Pump 3	X	X
	Tank Inerting		X
STORES MGT	AIM–9	*	
	Arm and Release Power – Stations 1 Thru 9		X
AVIONICS	Radar Altimeter		X
	MFD's	X	
	PFLD	*	
OTHER	Air Data Probe Heater (fuselage)	*	
	D ASHM		X
	Battery Charger	X	
	Data Link		X
NOTE: Equipment on this sheet may operate if MAIN GEN light was caused by bus contactor failure at nonessential bus No. 1.			

*Nacelle essential ac bus.

Emergency Power Distribution

MAIN, STANDBY, AND EPU GENERATORS FAILED
(All equipment from pages A-19 and A-20 plus the following:)

SYSTEM	INOPERATIVE EQUIPMENT	BUS ASSIGNMENT			
		EMER AC		EMER DC	
		NO. 1	NO. 2	NO. 1	NO. 2
ENGINE	Engine ANTI ICE Sw				X
	ENGINE FAULT Caution Light				X
	Engine Ice Detector		X		
	Fire/Overheat Detect and Test		X		
	HYD PRESS Indicators		X		
	NOZ POS Indicator		X		
	OIL Pressure Indicator		X		
FLIGHT INSTRUMENT	ADI		X		
	Altimeter (ELECT)	X			
	AOA Indexer			X	
	AOA Indicator	X			
	HSI		X		
	Turn Needle			X	
	INSTR MODE Select Sw			X	
	VVI	X			
FUEL	Automatic Forward Fuel Transfer				X
	FUEL FLOW Indicator	X			
	FUEL LOW Caution Lights			X	
	FUEL Quantity Indicator		X		
FLT CONT	Autopilot				X
	DBU ON Warning Light (branches A & B)			X	
	DBU ON Warning Light (branches C & D)				X
	C **DF** FLCS FAULT Caution Light (branches A & B)			X	
	DR FLCS FAULT Caution Light (branches C & D)				X
	FLCS RESET Switch (branches A & B)			X	
	FLCS RESET Switch (branches C & D)				X
	FLCS Power Source (branches A & B)			X	
	FLCS Power Source (branches C & D)				X
	FLCS Warning Light (branches A & B)			X	

Emergency Power Distribution

MAIN, STANDBY, AND EPU GENERATORS FAILED – CONT
(All equipment from pages A-19, A-20, and A-20.1 plus the following:)

SYSTEM	INOPERATIVE EQUIPMENT	BUS ASSIGNMENT			
		EMER AC		EMER DC	
		NO. 1	NO. 2	NO. 1	NO. 2
FLT CONT (Cont)	FLCS Warning Light (branches C & D)				X
	LEF's	X			
	Speedbrakes			X	
	Stick Trim			X	
NAV/COMM	EGI			X	
	IFF			X	
	ILS				X
	TACAN		X	X	
	VHF Radio			X	
STORES MGT	C ALT REL Button			X	
	CIU*			X	X
	Chaff Dispenser				X
	Gun		X		X
	EMER JETT Button*			X	X
	MASTER ARM Sw			X	
	MSL STEP Sw			X	
	NUCLEAR CONSENT Sw				X
	STORES CONFIG Caution Light				X
	C DF WPN REL Button				X
	DR WPN REL Button			X	
AVIONICS	CADC	X			
	CADC Caution Light			X	
	HUD				X
	HUD/CTVS		X		
	ICP/IKP				X
	MFD Video Control				X
	MMC*	X	X	X	X
	Upfront Controls		X		X
LIGHTS	ANTICOLLISION Strobe		X		
	AR (flood)		X		
	AR (slipway)				X

*Indicates redundancy.

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Emergency Power Distribution

MAIN, STANDBY, AND EPU GENERATORS FAILED – CONT
(All equipment from pages A-19, A-20, A-20.1, and A-20.2 plus the following:)

SYSTEM	INOPERATIVE EQUIPMENT	BUS ASSIGNMENT			
		EMER AC		EMER DC	
		NO. 1	NO. 2	NO. 1	NO. 2
LIGHTS (Cont)	Landing		X		
	LANDING/TAXI/External Sw				X
	MAL & IND LTS TEST/ BRT DIM			X	
	POSITION		X		
	PRIMARY CONSOLES	X			
	PRIMARY INST PNL	X			
LG/NWS/ BRAKES	LG Hydraulic Isolation				X
	LG Sequence (doors)				X
	LG UP–DN Command				X
	NWS			X	
	WHEELS Down Lights			X	
OTHER	Air Data Probe Heater (nose)	X			
	AOA Probe Heaters	X			
	AR System			X	
	AVTR/CTVS				X
	CABIN PRESS Caution Light				X
	CAMERA/GUN Trigger				X
	Cockpit Pressure Dump Capability				X
	Cockpit Temperature Control			X	
	Engine Bleed Air Valves (close capacity)				X
	EQUIP HOT Caution Light				X
	INLET ICING Caution Light				X
	OXY LOW Warning Light				X
	OBOGS Caution Light				X
	OBOGS Concentrator		X		
	OBOGS Monitor			X	
	Probe Heat Monitor			X	
	PROBE HEAT Sw			X	
	SEAT NOT ARMED Caution Light				X

Emergency Power Distribution

OPERATING EQUIPMENT – MAIN, STANDBY, AND EPU GENERATORS FAILED

SYSTEM	OPERATING EQUIPMENT	BUS ASSIGNMENT BATTERY NO. 1	BUS ASSIGNMENT BATTERY NO. 2
ENGINE	EDU		X
	PRI (no supersonic stall protection)*		
	PRI/SEC Transfer Circuit*		
INSTRU-MENTS	Airspeed/Mach Indicator*		
	Altimeter (PNEU)*		
	FTIT Indicator	X	
	RPM Indicator	X	
	SAI		X
FUEL	External Fuel Transfer*		
	FUEL MASTER Switch		X
	FFP*		
FLIGHT CONTROLS	Functional (except LEF’s, speedbrakes, autopilot, and stick trim)*		
NAV/COMM	Intercom	X	
	Magnetic Compass*		
	UHF Radio	X	
LIGHTS	Spotlights	X	
	Utility Light	X	
LG/NWS/ BRAKES	Alternate LG Extension*		
	Antiskid/Channel 1 Brakes	X	
	Antiskid/Channel 2 Brakes		X
	LG Uplock/Downlock	X	
	MLG WOW (branches A & B)	X	
	MLG WOW (branches C & D)		X
	NLG WOW (branches A & B)	X	
	NLG WOW (branches C & D)		X
	Parking Brake		X
WARNING LIGHTS	CANOPY	X	
	ENGINE	X	
	HYD/OIL PRESS	X	
	LG Warning (handle)		X

* Indicates items that do not require power through the battery buses.

Emergency Power Distribution

OPERATING EQUIPMENT – MAIN, STANDBY, AND EPU GENERATORS FAILED – CONT

SYSTEM	OPERATING EQUIPMENT	BUS ASSIGNMENT	
		BATTERY	
		NO. 1	NO. 2
CAUTION LIGHTS	ANTI SKID		X
	ELEC SYS		X
	HOOK		X
	MASTER CAUTION	X	
	SEC		X
OTHER	Canopy Activation*		
	Drag Chute	X	
	EPU	X	X
	Hook		X
	JFS	X	
	MAIN PWR Switch		X
	VMS	X	

* Indicates items that do not require power through the battery buses.

NOTES:

NOTES:

Flight Control Failures

1. If [ELEC SYS] is on, GO TO TAB A.
2. If [HYD/OIL PRESS] is on, GO TO TAB D.
3. If [FLCS FAULT] and/or [FLCS / DBU ON] or [TF FAIL] is on, depress F-ACK button and note PFL display(s).
4. If [AVIONICS] is on with PFL FLCS BUS FAIL, refer to FLCS page on MFD.

PFL	GO TO:	PAGE
FLCS WARNING LIGHT ILLUMINATED		
FLCS AOA WARN	AOA MALFUNCTION	B-5
STBY GAIN	AIR DATA MALFUNCTIONS	B-9
FLCS LEF LOCK	LEF MALFUNCTION (SYMMETRIC)	B-11
FLCS DUAL FAIL	FLCS DUAL ELECTRONIC FAILURE	B-15
FLCS FAULT CAUTION LIGHT ILLUMINATED		
FLCS AOA FAIL	AOA MALFUNCTION	B-5
FLCS ADC FAIL	AIR DATA MALFUNCTIONS	B-9
FLCS AOS FAIL	PILOT FAULT LIST–FLCS	EP-10
FLCS HOT TEMP	FLCS TEMPERATURE MALFUNCTION	B-13
BRK PWR DEGR	FLCS SINGLE ELECTRONIC FAILURE	B-15
FLCS CCM FAIL	FLCS SINGLE ELECTRONIC FAILURE	B-15
FLCS A/P FAIL	AUTOPILOT MALFUNCTIONS ...	B-17
FLCS A/P DEGR	AUTOPILOT MALFUNCTIONS ...	B-17
ISA (any) FAIL	SERVO MALFUNCTION	B-17
ISA ALL FAIL	SERVO MALFUNCTION	B-17
TF FAIL WARNING LIGHT ILLUMINATED		
TF FAIL	TF FAIL WARNING LIGHT	B-21
TF ATTD FAIL	TF FAIL WARNING LIGHT	B-21

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OTHER INDICATIONS:

Single failures:

- FLCS FAULT caution light.
- FLCS AOA FAIL PFL.

Dual failures (in addition to FLCS system code and FLCS AOA FAIL PFL):

- FLCS warning light.
- FLCS AOA WARN PFL.

OTHER CONSIDERATIONS:

1 Autopilot cannot be engaged.

2 If BRK PWR DEGR PFL is also present, refer to FLCS SINGLE ELECTRONIC FAILURE, page B-15.

3 Do not exceed 11° AOA during approach, landing, or two-point aerodynamic braking.

TRIM MALFUNCTION

1. TRIM/AP DISC sw – DISC, then NORM.

If normal operation is not restored:

2. TRIM/AP DISC sw – DISC. [1]
3. ROLL and PITCH TRIM wheels – As required.

AOA MALFUNCTION

If FLCS AOA FAIL PFL occurs: [2]

1. Establish 1g flight.
2. FLCS RESET sw – RESET.

If failure indications go off:

3. Continue normal operation.

If failure indications remain on:

3. Land as soon as practical. [3]

END

If FLCS AOA WARN PFL occurs:

1. Establish 1g flight.
2. FLCS RESET sw – RESET.

If FLCS warning light goes off:

3. Land as soon as practical. [3]

If FLCS warning light remains on:

3. Land as soon as possible. [3]

END

7 ″ Page

OTHER CONSIDERATIONS:

1 C Retarding the throttle below MIL while supersonic may induce inlet buzz which produces severe cockpit vibration and probable engine stalls.

2 If a CADC malfunction occurs, the FLCC AOS feedback function may deactivate.

3 Use AOA indications with caution.

4 Final approach airspeed

- C 135
- D 137
- Add 4 kts/1000 lb of fuel/stores weights equates to 13° AOA (add 8 kts for 11° AOA).

5 Do not use abrupt control inputs or make rudder inputs during rolls.

6 If possible, slow to 300 kts.

CADC MALFUNCTION 1C 2

If CADC caution light illuminates:

1. FLCS RESET sw – RESET.

If CADC caution light goes off:

2. Check for an ENG MACH FAIL PFL.

If ENG MACH FAIL PFL is still present:

3. Continue flight and observe throttle limitation, if supersonic. Refer to PILOT FAULT LIST – ENGINE, page EP-6.

If CADC caution light remains on:

2. AOA – Cross-check with airspeed. 3
3. Land as soon as practical. 4

DBU ON WARNING LIGHT

If DBU ON warning light illuminates:

1. Establish 1g flight. 5
2. Airspeed – 500 kts/0.9 mach max. 6
3. DIGITAL BACKUP sw – Cycle to BACKUP, then back to OFF.

(Cont)

OTHER CONSIDERATIONS:

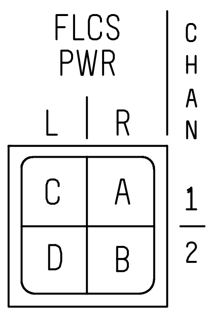
7 Verify that DBU is no longer present on the FLCS page of the MFD.

8 Do not exceed 500 kts/0.9 mach.

9 If possible, slow to 300 kts. Avoid abrupt control inputs. Restrict bank angle changes to less than 90°.

10 Lower LG at safe altitude and check handling qualities at 11°-13° AOA. A mild noseup transient of approx 2° occurs if LG is lowered below 200 kts.

11 Observe FLCS PWR lights and determine status of toe brakes. If branch A, B, or C FLCS PWR light fails to illuminate, use a maximum of 11° AOA for approach, landing, and two-point aerodynamic braking.



12 Plan a straight-in approach.

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If DBU ON warning light goes off: 7

4. FLCS RESET sw – RESET (if required).
5. Land as soon as practical. 8

END

If DBU ON warning light remains on:

4. DIGITAL BACKUP sw – BACKUP.
5. Airspeed – 500 kts/ 0.9 mach max. 9
6. Controllability – Check. 10
7. FLCS PWR TEST sw – TEST. 11
8. BRAKES channel sw – Change channels (if required).
9. Land as soon as possible. 12

END

7 1/8 ″ Page

OTHER INDICATIONS:

Single Failures:

- FLCS FAULT caution light.
- FLCS ADC FAIL PFL.

Dual Failures (in addition to FLCS ADC FAIL PFL):

- FLCS warning light.
- STBY GAIN PFL.

OTHER CONSIDERATIONS:

[1] If BRK PWR DEGR PFL is also present, refer to FLCS SINGLE ELECTRONIC FAILURE, Page B-15.

[2] Airspeed 240-650 kts with LG up.

[3] Do not slow below 240 kts with LG up if STBY GAIN PFL is still present.

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AIR DATA MALFUNCTIONS

If FLCS ADC FAIL PFL occurs: 1

1. Establish 1g flight.
2. FLCS RESET sw – RESET.

If failure indications go off:

3. Continue normal operation.

If failure indications remain on:

3. Land as soon as practical.

END

If STBY GAIN PFL occurs:

1. Establish 1g flight with max of 12° AOA. 2
2. FLCS RESET sw – RESET.
3. Land as soon as practical. 3

END

7 1/2 ″ Page

OTHER CONSIDERATIONS:

1 FLCS LEF LOCK PFL may not occur.

2 W Exceeding 12° AOA reduces departure resistance. Limit rolling maneuvers to a max bank angle change of 90° and avoid rapid roll rates.

3 Lock LEF's in landing configuration at final approach airspeed at a safe altitude. This makes final approach and landing as normal as possible and protects against uncommanded LEF excursions close to the ground.

4 With the LEF's at or near full up, there are no unique control inputs required. A small increase in airspeed may be noted compared to a normal landing approach at 11° AOA. With the LEF at or near full down, the aircraft may tend to float in ground effect and a slight forward stick force may be required.

5 C Placing MAIN PWR switch to OFF before hydraulic pressure is lost may cause damage to two LEF shafts.

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LEF MALFUNCTION (SYMMETRIC) 1

If an FLCS LEF LOCK PFL occurs or a malfunction is suspected (without an FLCS LEF LOCK PFL):

1. AOA – 12° max. 2 W
2. FLCS RESET sw – RESET.

If FLCS warning light resets:

3. Continue flight.

If FLCS warning light does not reset or a malfunction is suspected (without an FLCS LEF LOCK PFL):

4. Airspeed – Decelerate to subsonic flight if supersonic.
5. LE FLAPS sw – LOCK (after LG is down). 3
6. Land as soon as practical. 4

During engine shutdown:

7. MAIN PWR switch – Do not place to OFF until engine rpm has reached zero. 5 C

END

7 3/4 ″ Page

OTHER CONSIDERATIONS:

1 W ● Exceeding 10° AOA may result in insufficient roll authority. Limit rolling maneuvers to gentle roll in with a max bank angle of 30°.

● Flying a fast approach (lower than 6° AOA) presents additional control difficulties caused by a change in the path of the disturbed airflow coming off the failed LEF.

2 W Minimize rudder inputs. Use rudder as required to reduce sideslip when jettisoning stores or to aid in maintaining desired ground track during the final part of landing approach. Do not use rudder trim.

3 Lock operating LEF as near symmetrical as possible.

4 Consider selective jettison of stores from the heavy wing as a means to reduce roll control requirements. Refer to SELECTIVE JETTISON, page F-27.

5 C Reduce fuel weight if pilot arm fatigue is not a factor. Fuel flow is significantly higher with an LEF failed full up or down and must be considered during recovery.

6 Lower LG at a safe altitude and check handling qualities at 6°-8° AOA.

7 W ● Prior to landing with a significant asymmetric LEF condition, consider aircraft configuration, pilot experience level, pilot arm fatigue, airfield facilities, weather, winds, and light conditions (day/night). If conditions are not favorable, a controlled ejection is recommended.

● If crosswind component is greater than 10 kts, choose a runway, if possible, which allows landing with the heavy wing upwind. Fly a shallow, straight-in approach at approx 8° AOA (fly no lower than 6° AOA) with min roundout for touchdown. Use rudder, as required, to align aircraft with the runway immediately prior to touchdown.

8 C Until WOW, forward stick pressure in excess of approx 2 lbs results in full trailing edge down deflection of the horizontal tails with reduced directional control and wheel braking effectiveness.

LEF MALFUNCTION (ASYMMETRIC)

If LEF asymmetry occurs:

1. AOA – 6°-10°. 1W
2. Lateral stick/roll trim – As required. 2W
3. LE FLAPS sw – LOCK. 3
4. Stores – Jettison (if required). 4
5. Fuel weight – Reduce (if feasible/required). 5C
6. Controllability – Check. 6
7. Land as soon as practical. 7W
8. Stick – Lower the nose immediately after touchdown. 8C

If departure-end arrestment is required:

9. HOOK sw – DN.

FLCS TEMPERATURE MALFUNCTION

If an FLCS HOT TEMP PFL occurs:

1. Airspeed – 400 kts max (subsonic).

(Cont)

OTHER CONSIDERATIONS:

9 If possible, descend below 15,000 ft MSL.

10 W ● With the ECS shut down or the AIR SOURCE knob in OFF or RAM, the g-suit does not inflate and PBG is disabled.

● If AIR SOURCE knob is placed to OFF or RAM, OBOGS is inoperative. Activate EOS if OXY LOW warning light illuminates above 10,000 ft cockpit altitude.

11 External fuel cannot be transferred in OFF or RAM. Consider jettisoning tanks to decrease drag if range is critical and the ECS cannot be turned on for short periods of time to transfer fuel.

12 It may take up to 15 minutes for ram-air cooling to extinguish the light.

2. Altitude – 25,000 ft MSL max. [9]
3. AIR SOURCE knob – RAM. [10W] [11]

If failure indications go off: [12]

4. Land as soon as practical.

If failure indications remain on:

5. Land as soon as possible.

END

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OTHER INDICATIONS:

Single Failures:

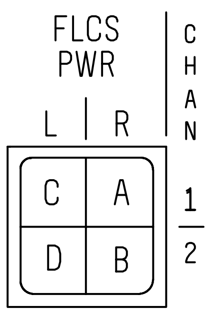
- FLCS FAULT caution light.
- FLCS AOA FAIL and FLCS ADC FAIL PFL's may accompany a BRK PWR DEGR PFL.

Dual Failures:

- FLCS warning light.

OTHER CONSIDERATIONS:

[1] Observe FLCS PWR lights and determine brake and brake channel affected. If branch A, B, or C FLCS PWR light fails to illuminate, use a max of 11° AOA for approach, landing, and two-point aerodynamic braking.



[2] The ATF NOT ENGAGED caution light may illuminate shortly after depressing the ADV MODE sw.

[3] Reset may clear the FLCS warning light; however, the single failure is still present.

[4] ● No significant flying qualities degradation should occur; however, with an FLCS dual failure, the FLCS has no redundancy.

● Two minutes after WOW, the FLCS FAULT caution light illuminates and an FLCS SNGL FAIL PFL occurs.

FLCS SINGLE ELECTRONIC FAILURE

If BRK PWR DEGR or FLCS CCM FAIL PFL occurs:

1. Establish 1g flight and airspeed less than 400 kts (subsonic).
2. FLCS RESET sw – RESET.

If failure indications go off:

3. Continue normal operation.

If failure indications remain on:

3. FLCS PWR TEST sw – TEST. [1]
4. BRAKES channel sw – Change channels (if required).
5. Land as soon as practical.

FLCS DUAL ELECTRONIC FAILURE

If FLCS DUAL FAIL PFL occurs:

1. Establish 1g flight and airspeed less than 400 kts (subsonic).
2. ADV MODE sw – Depress. [2]
3. FLCS RESET sw – RESET. [3]

If FLCS warning light goes off and no FLCS PFL's are present:

4. Continue normal operation, but do not use ADV MODE sw.

If FLCS warning light goes off and an FLCS PFL is still present:

4. FLCS PWR TEST sw – TEST. [1]
5. BRAKES channel sw – Change channels (if required).
6. Land as soon as practical.

END

If FLCS warning light remains on:

4. FLCS PWR TEST sw – TEST. [1]
5. BRAKES channel sw – Change channels (if required).
6. Land as soon as possible. [4]

END

OTHER CONSIDERATIONS:

[1] Below 15 degrees AOA.

[2] Hydraulic failures or momentary drops in hydraulic pressure (e.g., wake turbulence encounter, air in hydraulic system) also illuminate the FLCS FAULT caution light and cause an ISA ALL FAIL PFL.

AUTOPILOT MALFUNCTIONS

If FLCS A/P FAIL PFL occurs:

1. Establish 1g flight. [1]
2. FLCS RESET switch – RESET.

If PFL clears:

3. Continue normal operation.

If PFL remains, autopilot cannot be engaged.

If FLCS A/P DEGR PFL occurs:

1. Maneuver aircraft into autopilot envelope.
2. FLCS RESET switch – RESET.

If PFL clears:

3. Continue normal operation.

If PFL remains:

3. Disengage autopilot.

SERVO MALFUNCTION [2]

1. Airspeed – 400 kts max (subsonic).

If a hydraulic failure is confirmed:

2. Go to SINGLE (page D-15)/DUAL (page D-17) HYDRAULIC FAILURE.

If hydraulic pressures are normal:

3. FLCS RESET sw – RESET.

If failure indications go off:

4. Continue normal operation.

END

If failure indications remain on:

4. Land as soon as practical.

END

OTHER CONSIDERATIONS:

1 W ● Recovery from a deep stall condition will present a low airspeed situation in which the aircraft may require more than 6000 ft of altitude to attain level flight.

● If recovery (pitch rate stopped, AOA within −5 to +25°, and airspeed 200 kts or greater) is not apparent by 6000 ft AGL, eject.

2 Engine may stall when out of control.

3 If other than AB, do not move the throttle.

4 Positive g, AOA indicator pegged at 32° (upright deep stall) or negative g, AOA indicator pegged at −5° (inverted deep stall).

5 Maintain firm pressure.

6 W ● The MPO sw must be held in the OVRD position until the deep stall is positively broken as evidenced by the pitch rate stopping, AOA in the normal range (−5 to +25°), and airspeed increasing above 200 kts. Early release of the MPO sw may delay recovery.

● Failure to adequately secure and tighten lapbelt may result in inability to reach and operate the MPO sw during out-of-control situations.

7 W Pitch rocking with a high sustained yaw rate may prevent recovery. Delay stick inputs until yaw rotation stops or is minimized. Pitch, roll, and yaw oscillations associated with a deep stall should not be confused with the continuous yaw rotation associated with a spin.

OUT-OF-CONTROL RECOVERY 1W 2

In the event of a departure from controlled flight, accomplish as much of the following as required to effect a recovery:

1. Controls – Release.
2. Throttle – MIL if in AB. 3

If still out of control: 4

3. MPO sw – OVRD and hold. 5 6W
4. Stick – Cycle in-phase. 7W

END

OTHER CONSIDERATIONS:

1 In the event that structural damage of unknown extent is encountered or if continued control of the aircraft is in doubt, consider accomplishing applicable steps of EJECTION (TIME PERMITTING), page F-23, prior to proceeding with CONTROLLABILITY CHECK.

2 If LEF damage is observed, consider locking LEF's.

3 W If a condition which might cause asymmetric TEF extension exists, consider alternate LG extension with the LG handle in UP to preclude TEF extension.

If the LG handle remains up:

- Final approach airspeed is 20 kts higher than normal.
- The TO/LDG CONFIG warning light may illuminate.
- Nozzle remains closed, resulting in higher than normal landing thrust.
- NWS is inoperative.
- BRAKES CHAN 2 must be selected.
- FLCS remains in cruise gains. Consider positioning AIR REFUEL sw to OPEN to obtain takeoff and landing gains.
- The LG handle warning light remains on to indicate the position of the gear handle is not in agreement with the actual gear position.

4 W If the aircraft is not controllable down to a reasonable landing speed (given consideration to weather, runway condition, facilities, pilot experience, pilot arm fatigue, etc.), an ejection is recommended.

5 Climb to min enroute altitude (MEA) or depart low altitude environment, if required.

6 This action interrupts the fly-up in ATF or manual TF (if enabled).

7 If a SWIM PFL is displayed, the TF malfunction was detected by one or more SWIM monitors.

8 If the malfunction was detected by SWIM and this malfunction is no longer present, releasing the paddle sw resets the SWIM monitors, cancels the fly-up, and extinguishes the TF FAIL warning light.

9 W Further TF operations should not be attempted after the occurrence of a SWIM ATTD FAIL or SWIM VEL FAIL PFL.

CONTROLLABILITY CHECK

The following items should be accomplished:

1. Attain safe altitude. 1
2. GW – Reduce (as required).
3. LE FLAPS sw – LOCK (if required). 2
4. Determine optimum configuration available for landing. 3 W
5. Stores – Selectively jettison (if required). Refer to SELECTIVE JETTISON, page F-27.
6. Slow only to that AOA/airspeed which allows acceptable handling qualities. 4 W

TF FAIL WARNING LIGHT

If TF FAIL warning light illuminates:

1. Altitude – As required. 5
2. Paddle sw – Depress (if required). 6
3. PFLD – Check. 7
4. CARA, EGI, MMC – Check for proper operation.

If SWIM ATF FAIL, SWIM NVP FAIL, SWIM RALT FAIL, or SWIM SCP FAIL PFL is displayed:

5. Paddle sw – Release. 8

If SWIM ATF FAIL, SWIM NVP FAIL, SWIM RALT FAIL, or SWIM SCP FAIL PFL does not clear or recurs:

6. Discontinue TF operations.

If SWIM ATTD FAIL or SWIM VEL FAIL PFL is displayed:

5. Paddle sw – Release.
6. Discontinue TF operations. 9 W

If no SWIM PFL was present (NVP malfunction):

5. Paddle sw – Release.
6. Perform TFR BIT.

If NVP malfunction still exists:

7. Discontinue TF operations.

END

NOTES:

NOTES:

This section contains F100-PW-229 engine data.

Engine Malfunctions

1. If ENG FIRE / ENGINE is on, check RPM and FTIT indications. If RPM and FTIT indications are normal, land as soon as practical.

NOTES:

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OTHER CONSIDERATIONS:

[1] Hot start – FTIT over 800°C. During engine start, if the FTIT increases at an abnormally rapid rate through 750°C, a hot start can be anticipated.

[2] Motor engine with JFS until FTIT reaches 200°C or for four minutes (JFS ground operating limit), whichever occurs first.

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HOT START (GROUND) 1

1. Throttle – OFF.
2. FTIT indicator – Monitor.

If FTIT remains above 500°C:

3. JFS sw – START 2. 2

END

5 1/2 ″ Page

OTHER CONSIDERATIONS:

[1] • Hung start – RPM has stopped increasing below IDLE and FTIT is stabilized at less than 800°C.

• No start – Light-off does not occur within 20 seconds.

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HUNG START/NO START [1]

1. Throttle – OFF. Notify maintenance.

ENGINE AUTOACCELERATION (GROUND)

1. Throttle – OFF.
2. FUEL MASTER sw – OFF.

END

5 3/4 ″ Page

OTHER CONSIDERATIONS:

1 An engine or JFS fire/overheat can be detected by flames, smoke, explosion, signal from ground crew, or radio call. FTIT may exceed 800°C and, if ac power is available, ENG FIRE warning or OVERHEAT caution light may illuminate.

FIRE/OVERHEAT/FUEL LEAK (GROUND) 1

1. Throttle – OFF.
2. JFS sw – OFF.
3. FUEL MASTER sw – OFF.
4. ENG FEED knob – OFF (if external power applied).

If fire continues:

5. Abandon aircraft.

END

6 ″ Page

OTHER CONSIDERATIONS:

6 ″ Page

ENGINE FAILURE ON TAKEOFF

If conditions permit:

1. Abort.

If conditions do not permit an abort:

1. Zoom.
2. Stores – Jettison (if possible).
3. Eject.

END

6 1/4 ″ Page

OTHER CONSIDERATIONS:

1 The chances for a successful AB light with the nozzle open more than 30 percent are reduced.

2 W With nozzle loss, catastrophic engine failure and fire are probable with prolonged high power settings above 850°C FTIT while in SEC.

3 In a partial thrust situation, thrust available may increase as altitude decreases. 250 kts approximates the airspeed at which thrust required for level flight is the lowest.

4 ● With a missing nozzle, level flight may not be attainable above 5000 ft MSL.

● If descent is required, maintain 250 kts with throttle set at 850°C FTIT.

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AB MALFUNCTION ON TAKEOFF

If decision is made to stop:

1. Abort.

If takeoff is continued:

1. Throttle – MIL.
2. Stores – Jettison (if required).

LOW THRUST ON TAKEOFF OR AT LOW ALTITUDE (NON-AB)

If on takeoff and the decision is made to stop:

1. Abort.

If takeoff is continued and/or thrust is insufficient:

1. Throttle – AB. 1

If thrust is still insufficient or AB does not light:

2. ENG CONT sw – SEC. 2 W 3
3. Stores – Jettison (if required).

If nozzle is failed open, damaged, or missing:

4. Airspeed – Climb to arrive at 250 kts or descend at 250 kts to obtain level flight above min recommended ejection altitude or min safe altitude, whichever is appropriate. 4

(Cont)

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OTHER CONSIDERATIONS:

5 C If airspeed drops below 250 kts, trade altitude to reacquire 250 kts. Do not descend below min recommended ejection altitude or min safe altitude, whichever is appropriate.

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If level flight cannot be maintained by 1000 ft above min recommended ejection altitude or min safe altitude, whichever is appropriate:

5. Throttle – As required to maintain 250 kts in level flight. 5 C
6. Land as soon as possible. Plan a flameout landing. Refer to FLAMEOUT LANDING, page C-33.

END

6 3/8 ″ Page

OTHER CONSIDERATIONS:

1 Maintain takeoff thrust until min recommended ejection altitude is attained and then throttle to min practical.

2 If fire occurred in AB, ENG FIRE warning light may not illuminate. Fire should extinguish after throttle is retarded; however, nozzle damage may result in lower than normal thrust.

3 Determine if fire detection circuit is functional.

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ENGINE FIRE

If on takeoff and conditions permit:

1. Abort.

If takeoff is continued:

1. Climb. [1]
2. Stores – Jettison (if required).

At a safe altitude:

3. Throttle – Min practical. [2]

If ENG FIRE warning light goes off:

4. FIRE & OHEAT DETECT button – Depress. [3]

If fire persists:

5. Eject.

END

If fire indications cease:

5. Land as soon as possible.

END

OTHER CONSIDERATIONS:

1 If the OVERHEAT caution light goes off, verify the integrity of the detection circuit by depressing the FIRE & OHEAT DETECT button and land as soon as possible.

2 Determine if fire detection circuit is functional.

3 If the EPU was manually turned on, consider turning it off to determine if it is the source of the overheat condition. If the OVERHEAT caution light remains on, the EPU should be turned back on.

4 External fuel cannot be transferred in OFF or RAM. Consider jettisoning tanks to decrease drag if range is critical and the ECS cannot be turned on for short periods of time to transfer fuel.

5 W ● With the ECS shut down or the AIR SOURCE knob in OFF or RAM, the g-suit does not inflate and PBG is disabled.

● With the AIR SOURCE knob in OFF or RAM, OBOGS is inoperative. Activate EOS if OXY LOW warning light illuminates above 10,000 ft cockpit altitude.

6 If in VMC and the ADI and HSI are not required for flight, the EGI should be considered nonessential.

7 W If LG handle does not lower, select BRAKES CHAN 2 and position ALT FLAPS sw to EXTEND. Nozzle remains closed, resulting in higher than normal landing thrust.

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OVERHEAT CAUTION LIGHT 1

If OVERHEAT caution light illuminates:

1. Throttle – Min practical.
2. FIRE & OHEAT DETECT button – Depress. 2

If OVERHEAT caution light remains on (or detect circuit checks bad) and EPU is running:

3. EPU sw – OFF (if feasible). 3

If OVERHEAT caution light remains on (or detect circuit checks bad):

4. OXYGEN – 100%.
5. AIR SOURCE knob – OFF. 4 5W
6. Descend to below 25,000 ft and reduce airspeed to below 500 kts.

When airspeed is reduced and cockpit is depressurized:

7. AIR SOURCE knob – RAM (below 25,000 ft). 4 5W
8. Nonessential electrical equipment – Off. 6

If OVERHEAT caution light still remains on (or detect circuit checks bad):

9. TANK INERTING sw – TANK INERTING even if Halon is not available.
10. LG handle – DN (300 kts/0.65 mach max). (Use DN LOCK REL button if required.) 7W
11. Land as soon as possible.

END

7 ″ Page

OTHER INDICATIONS:

- Below 15 psi at IDLE.
- Below 30 psi at MIL.
- Above 95 psi.
- Pressure fluctuations greater than ±5 psi at IDLE or ±10 psi above IDLE.
- Lack of oil pressure rise when the rpm is increased.

OTHER CONSIDERATIONS:

[1] The rate of oil loss is decreased at low altitudes and low throttle settings.

[2] Monitor hydrazine use. If consumption rate is too high, cycle EPU sw to OFF, then NORM to conserve hydrazine. Be prepared to place EPU sw back to ON if the engine seizes.

[3] [C] ● Throttle movement/rpm change may cause engine seizure.

● Do not start the JFS if engine seizure has occurred or is anticipated. Starting the JFS may result in no brake/JFS accumulator pressure for the brakes.

[4] Plan to fly an SFO. Refer to FLAMEOUT LANDING, page C-33.

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ENGINE VIBRATIONS

If vibrations persist:

1. Throttle – Minimum practical.
2. Land as soon as possible.

OIL SYSTEM MALFUNCTION

If an oil pressure malfunction is suspected:

1. Attain desired cruise altitude. [1]
2. Stores – Jettison (if required).
3. Throttle – Approx 80 percent rpm.
4. EPU sw – ON. [2]
5. Throttle – Do not move until landing is assured. [3] [C]
6. Land as soon as possible. [4]
7. Refer to ACTIVATED EPU/HYDRAZINE LEAK, page F-13.

END

OTHER CONSIDERATIONS:

1 W Assume engine alternator is inoperative or malfunctioning. If the engine is shut down, an airstart may not be possible.

2 Non-AB stalls may be inaudible.

3 Stalls may be caused by anti-ice valve failing to close at high thrust setting (throttle above midrange).

4 W Shutting down the engine with an engine alternator failure (indicated by zero or erroneously low rpm, illuminated SEC caution light, illuminated ENGINE warning light, and normal thrust) results in no ignition for an airstart.

5 If a non-AB stall clears, maintain throttle at midrange or below unless required to sustain flight.

6 If an AB stall clears, the engine is safe to operate in the IDLE to MIL range, provided no other abnormal indication is observed. Attempt further AB operation only if needed to sustain flight.

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ZERO RPM/ERRONEOUS RPM INDICATION 1 W

If SEC caution light is illuminated:

1. Go to SEC CAUTION LIGHT, page C-29.

If SEC caution light is not illuminated:

1. Land as soon as practical.

ENGINE STALL RECOVERY

If an AB stall(s) occurs:

1. Throttle – Snap to MIL.

If AB stalls do not clear or stall(s) occurs below AB: 2

2. Throttle – IDLE.
3. ANTI ICE sw – OFF when conditions permit. 3

If stalls continue at idle and engine rpm is less than 60 percent with no rpm response to throttle movement:

4. Throttle – OFF. Initiate airstart. Refer to AIRSTART PROCEDURES, page C-31. 4 W

If non-AB stall(s) clears:

5. Throttle – Midrange or below. 5
6. Land as soon as possible.

END

If AB stall(s) clears:

2. Throttle – As required. 6

END

7 1/2 ″ Page

OTHER CONSIDERATIONS:

- Engine oscillations.
- Insufficient thrust at MIL (with or without correct indications).
- Lack of response to throttle commands.
- Nozzle indicating or suspected full open or closed.

OTHER CONSIDERATIONS:

1 W ● Failure to monitor sink rate and height above terrain while applying low thrust recovery procedures can result in ejection outside ejection seat performance envelope.

● If the throttle is stuck and thrust is suitable for sustained flight, attempts to free the throttle should be delayed until within gliding distance of a suitable landing field.

● Jettison stores when necessary to increase flying time available to complete actions designed to restore thrust.

2 ● Transfer to SEC removes stall recovery logic. If SEC is selected while the engine is stalling, a stagnation may occur.

● The ENG CONT sw should not be returned to C DF PRI, DR NORM after landing in an attempt to open the nozzle and decrease thrust.

3 C Retarding the throttle below MIL while supersonic may induce inlet buzz which produces severe cockpit vibration and probable engine stalls.

4 Stalls may be caused by the anti-ice valve failing to close at high throttle settings (above midrange).

5 Attempts to establish a min practical throttle setting that provides sufficient thrust may result in repeated stalls that clear when the throttle is retarded. Note stalled RPM/throttle position and attempt to establish a lower throttle setting that provides sufficient thrust.

6 Transfer to SEC while supersonic should be accomplished with the throttle at MIL; if the throttle can not be retarded to MIL, transfer to SEC is permissible with the throttle in AB. Subsonic transfers to SEC below 40,000 ft MSL should be accomplished with the throttle at midrange or above.

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ABNORMAL ENGINE RESPONSE 1W 2

If in AB or supersonic:

1. Throttle – MIL. 3C

If thrust is low and nozzle is suspected to be failed open, damaged, or missing:

2. Refer to NOZZLE FAILURE, page C-25.

If problem still exists:

3. C DF AB RESET sw – AB RESET, then NORM.
4. Airspeed – 250 kts (if thrust is too low to sustain level flight).

If problem still exists:

5. Throttle – IDLE.
6. ANTI ICE sw – OFF. 4
7. Throttle – Slowly advance to min practical. 5

If current thrust will allow a safe landing:

8. Land as soon as possible.

If suitable thrust cannot be attained or thrust is too high to permit a safe landing:

8. Throttle – Midrange.
9. ENG CONT sw – SEC. 6
10. Throttle – Min practical.

(Cont)

OTHER INDICATIONS:

7 During landing in SEC, idle thrust is approximately twice that in PRI.

8 C An SFO is not recommended if engine is operating satisfactorily in SEC.

9 If throttle is stuck, control might be regained by depressing the cutoff release, rotating the throttle outboard, and applying necessary force.

10 W Do not start the JFS if engine seizure has occurred or is anticipated or if engine failure is a result of fuel starvation. Starting the JFS may result in no brake/JFS accumulator pressure for the brakes.

11 W Delaying engine shutdown can result in a long, fast landing. Wheel braking is less effective due to lack of WOW and there is an increased probability of a missed cable engagement.

12 If throttle is stuck or engine does not respond, shut down the engine with the FUEL MASTER sw. At MIL, the engine flames out in approx 6 sec. At IDLE, the engine flames out in approx 45 sec.

13 W The hook may miss the cable if the aircraft is not slow enough to compress the MLG struts sufficiently to make WOW or if forward stick pressure is held.

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If current SEC thrust will allow a safe landing.

11. Land as soon as practical. 7 8C

When landing is assured:

12. Throttle – Verify engine responds normally to throttle movement from IDLE to MIL; set as required.

If suitable thrust cannot be attained:

11. ENG CONT sw – C DF PRI, DR NORM.
12. Throttle – AB (if required to sustain level flight).
13. Land as soon as possible.

If thrust is too high to permit a safe landing: 9

11. Plan a flameout landing. Refer to FLAMEOUT LANDING, page C-33. 10W

When prepared to land (normally high key): 11W

12. Throttle – OFF. 12
13. HOOK sw – DN (if required). 13W

END

OTHER CONSIDERATIONS:

1 SEC should only be selected when it becomes apparent that sufficient thrust cannot be achieved in PRI. SEC eliminates the additional thrust and the engine protection benefits provided by the DEEC in PRI. The nozzle loss logic holds the engine in PRI for these reasons.

2 W With nozzle loss, catastrophic engine failure and fire are probable with prolonged high power settings above 850°C FTIT while in SEC.

3 C If airspeed drops below 250 kts, trade altitude to reacquire 250 kts. Do not descend below min recommended ejection altitude or min safe altitude, whichever is appropriate.

7 5/8 ″ Page

NOZZLE FAILURE

If thrust is low and a failed open, damaged, or missing nozzle is suspected:

1. Throttle – MIL or below.
2. Stores – Jettison (if required).
3. Airspeed – 250 knots.

If thrust is sufficient to reach a suitable landing field:

4. Land as soon as possible. Plan a flameout landing. Refer to FLAMEOUT LANDING, page C-33.

If unable to reach a suitable landing field and level flight cannot be maintained by 1000 ft above min recommended ejection altitude or min safe altitude, whichever is appropriate:

5. ENG CONT sw – SEC. 1
6. Throttle – As required to maintain 250 kts in level flight above minimum recommended ejection altitude or minimum safe altitude, whichever is appropriate. 2W 3C
7. Land as soon as possible. Plan a flameout landing. Refer to FLAMEOUT LANDING, page C-33.

END

OTHER CONSIDERATIONS:

1 If stores jettison is attempted after main and standby generators drop off line but before EPU generator powers the SMS (approx 5 seconds delay), stores will not jettison.

2 Visually confirm the stores have jettisoned and jettison again if required.

3 W Below 4000 ft AGL, there may be insufficient time to perform an airstart prior to min recommended ejection altitude.

LOW ALTITUDE ENGINE FAILURE OR FLAMEOUT

If low altitude engine failure or flameout occurs:

1. Zoom.
2. Stores – Jettison (if required). 1 2
3. Perform airstart (if altitude permits), Refer to AIRSTART PROCEDURES, page C-31. 3 W

END

8 1/4 ″ Page

OTHER CONSIDERATIONS:

[1] The ENG CONT sw should not be returned to [C] [DF] PRI, [DR] NORM after landing in an attempt to open the nozzle and decrease thrust.

[2] [C] Retarding the throttle below MIL while supersonic may induce inlet buzz which produces severe cockpit vibration and probable engine stalls.

[3] AB operation is inhibited. Above 40,000 ft MSL, minimize throttle movement.

[4] [W] If the rpm indication is also zero or erroneously low, the engine alternator may have failed. If the engine is shut down, an airstart may not be possible.

[5] During landing in SEC, idle thrust is approximately twice that in PRI with a normal nozzle.

[6] If ENG BUS FAIL PFL is displayed or has been displayed, MUX communication with the EDU is no longer possible. Subsequently, if an engine PFL occurs, the ENGINE FAULT caution light illuminates but cannot be reset and that PFL cannot be displayed on the PFLD.

[7] This action resets the DEEC and may clear the failure condition.

[8] The failure condition no longer exists if the PFL is not present during the fault recall.

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SEC CAUTION LIGHT [1]

If SEC caution light illuminates while supersonic:

1. Throttle – Do not retard below MIL until subsonic. [2] [C]

When subsonic or if SEC caution light illuminates while subsonic:

2. Throttle – Verify engine responds normally to throttle movement from IDLE to MIL; set as required. [3] [4] [W]
3. ENG CONT sw – SEC.
4. Land as soon as practical. [5]

If engine is operating abnormally in SEC:

5. Refer to ABNORMAL ENGINE RESPONSE, page C-23.

ENGINE FAULT CAUTION LIGHT

If ENGINE FAULT caution light illuminates:

1. PFLD – Note PFL(s) displayed. [6]
2. [C] [DF] F-ACK, [DR] FAULT ACK button – Depress to acknowledge fault.

If ENGINE FAULT caution light does not reset when the fault is acknowledged:

3. Throttle – 85 percent RPM or less.
4. Land as soon as possible.

If ENGINE FAULT caution light resets when the fault is acknowledged:

3. Refer to PILOT FAULT LIST – ENGINE, page EP-6.
4. [C] [DF] AB RESET sw – AB RESET, then NORM. [7]
5. [C] [DF] F-ACK, [DR] FAULT ACK button – Depress to perform fault recall. [8]

END

OTHER CONSIDERATIONS:

1 If the throttle is retarded to OFF to clear a stall, it should be maintained in OFF for a few seconds to allow the stall to clear.

2 W With engine failure or flameout, OBOGS is inoperative. Activate EOS if OXY LOW warning light illuminates above 10,000 ft cockpit altitude.

3 FTIT will decrease rapidly when throttle is OFF.

4 Above 30,000 ft MSL, dive at 400 kts/0.9 mach. Below 30,000 ft MSL, establish approx 250 kts. When below 20,000 ft MSL with the JFS RUN light on and PRI mode confirmed, airspeed can be reduced to achieve max range or max endurance (C 200 or 170, D 205 or 175 kts, respectively, plus 5 kts per 1000 lb of fuel/store weights and plus 5 kts if CFT's are installed).

5 ● If the JFS sw is erroneously placed to START 1, leave it there.

● If the JFS RUN light does not illuminate or goes off once illuminated, place the JFS sw to OFF and reattempt START 2 when the brake/JFS accumulators are recharged. The JFS sw does not relatch in either start position while the JFS is spooling down.

6 If stores jettison is attempted after main generator drops off line but before EPU generator powers the SMS (approx 5 sec delay), stores will not jettison.

7 Visually confirm the stores have jettisoned and jettison again if required.

8 ● Place the ENG CONT sw to SEC prior to placing the throttle to midrange, otherwise a start anomaly may result.

● The proximity of the ENG CONT sw to the JFS sw makes the JFS sw susceptible to being bumped to OFF when selecting SEC.

AIRSTART PROCEDURES 1 2W

To accomplish an airstart:

1. Throttle – OFF, then midrange. 3
2. Airspeed – As required. 4
3. JFS sw – START 2 below 20,000 ft MSL and below 400 kts. 5
4. Stores – Jettison (if required). 6 7

If a no light, hot start, or stall occurs:

5. Throttle – OFF.
6. ENG CONT sw – SEC if below 30,000 ft MSL (250 kts min). 8
7. Throttle – Midrange.

If a hung start occurs:

8. Airspeed – Increase (max of 400 kts/0.9 mach).

If a hung start continues or there is no throttle response:

9. Throttle – OFF when below 30,000 ft MSL.
10. ENG CONT sw – SEC (250 kts min). 8
11. Throttle – Midrange.

(Cont)

OTHER CONSIDERATIONS:

9 C Do not turn JFS or EPU off if indicated rpm is below 60 percent with adequate thrust (e.g., tower shaft failure).

10 Verify MAIN GEN and STBY GEN lights are off.

11 If warning flag(s) is in view, refer to EGI FAILURE, page F-29.

12 If the SEC caution light is on, refer to SEC CAUTION LIGHT, page C-29.

If engine does not respond normally after airstart is completed:

12. Refer to FLAMEOUT LANDING, page C-33.

If engine responds normally: 9 C

12. JFS sw – OFF.
13. ELEC CAUTION RESET button – Depress. 10
14. EPU sw – OFF, then NORM.
15. ADI – Check for presence of OFF and/or AUX warning flags. 11
16. Throttle – As required. 12
17. Land as soon as possible.
18. Refer to ACTIVATED EPU/HYDRAZINE LEAK, page F-13.

END

OTHER CONSIDERATIONS:

[1] Altitudes (overhead approach):

- High key – 7000-10,000 ft AGL.
  Recommended altitude is [C] 7000, [D] 7500 ft AGL plus 500 ft per1000 lb of fuel/store weights and plus 500 ft if CFT's are installed.

- Low key – 3000-5000 ft AGL.
  Recommended altitude is [C] 3000, [D] 3250 ft AGL plus 250 ft per1000 lb of fuel/store weights and plus 250 ft if CFT's are installed.

- Base key – 2000 ft AGL min.

Altitudes (straight-in approach):

- Clean glide – 7000 ft AGL min at 8 nm.
- Lower LG – 4000-8000 ft AGL at 4 nm.
  Delay lowering LG until initial aimpoint is 11°-17° below the horizon.

[2][W] Eject if a safe landing cannot be made. Ejection can be accomplished at any point in the pattern but do not delay ejection below 2000 ft AGL in an attempt to salvage a questionable approach.

[3] Increase airspeed by 5 kts per 1000 lb of fuel/store weights and plus 5 kts if CFT's are installed. This airspeed equates to approx 7°AOA.

[4] During an airstart attempt, do not slow below the min airstart airspeed.

FLAMEOUT LANDING 1 2W

1. Stores – Jettison (if required).
2. Airspeed – C 200, D 205 kts. 3 4
3. EPU sw – ON.

(Cont)

C

FUEL/ STORE	ALTITUDE – FEET AGL		KIAS		
WT	HI	LOW	LG-UP	LG-DN	MIN
1000	7000	3000	200	190	180
2000	7500	3250	205	195	185
3000	8000	3500	210	200	190
4000	8500	3750	215	205	195
5000	9000	4000	220	210	200
6000	9500	4250	225	215	205
7000	10,000	4500	230	220	210
8000	10,500	4750	235	225	215

D

FUEL/ STORE	ALTITUDE – FEET AGL*		KIAS**		
WT	HI	LOW	LG-UP	LG-DN	MIN
0000	7500	3250	205	195	185
1000	8000	3500	210	200	190
2000	8500	3750	215	205	195
3000	9000	4000	220	210	200
4000	9500	4250	225	215	205
5000	10,000	4500	230	220	210
6000	10,500	4750	235	225	215
7000	11,000	5000	240	230	220
8000	11,500	5250	245	235	225

*Add 500 ft (HI) or 250 ft (LOW) if CFT's are installed.
**Add 5 kts if CFT's are installed.

OTHER CONSIDERATIONS:

5 W ● Min EPU fuel quantity without (with) JFS running:
- Overhead approach at high key – 25 (20) percent.
- Straight-in approach:
  - 8 nm – 45 (40) percent.
  - 4 nm – 25 (20) percent.

● The JFS alone does not provide adequate hydraulic pressure to land the aircraft.

● Do not start the JFS if engine seizure has occurred or is anticipated or if engine failure is a result of fuel starvation. Starting the JFS may result in no brake/JFS accumulator pressure for the brakes.

6 ● If engine is not operating, consider placing the FUEL MASTER sw to OFF if a fuel leak exists. This action may conserve fuel for the JFS.

● If the JFS is erroneously placed to START 1, leave it there.

● If the JFS RUN light does not illuminate or goes off once illuminated, place the JFS sw to OFF and reattempt START 2 when the brake/JFS accumulators are recharged. The JFS sw does not relatch in either start position while the JFS is spooling down.

7 W ● Do not delay lowering LG below 2000 ft AGL.

● If LG handle does not lower, select BRAKES CHAN 2 and position ALT FLAPS sw to EXTEND. Nozzle remains closed, resulting in higher than normal landing thrust.

8 Alternate LG extension can be used up to 300 ks; however, the NLG may not fully extend until 190 ks. Time above 190 kts should be minimized in case there is a leak in the pneumatic lines.

9 C ● NWS is not available following alternate LG extension.

● Do not depress the ALT GEAR reset button while pulling the ALT GEAR handle. This action may preclude successful LG extension.

10 Increase airspeed by 5 kts per 1000 lb of fuel/store weights and plus 5 kts if CFT's are installed.

11 W Do not allow airspeed to decrease below C 180, D 185 kts, plus 5 kts per 1000 lb of fuel/store weights and plus 5 kts if CFT's are installed.

12 C ● Brakes should be applied in a single, moderate, and steady application without cycling the antiskid.

● Brake pedal deflection of 1/16 inch activates the brakes and bleeds the brake/JFS accumulators. To avoid brake activation and loss of accumulator fluid, do not rest feet on the brake pedals.

● Do not attempt to taxi clear of the runway. Loss of brake/JFS accumulator pressure results in the inability to stop or steer the aircraft.

4. JFS sw – START 2 below 20,000 feet MSL and below 400 knots. 5W 6
5. AIR SOURCE knob – RAM (below 25,000 ft MSL).
6. DEFOG lever – Forward.
7. LG handle – DN. (Use DN LOCK REL button if required.) 7W
8. ALT GEAR handle – Pull (if required) (190 kts max, if practical). 8 9C
9. Airspeed - C 190, D 195 kts optimum in pattern. 10 11W

After touchdown:

10. DRAG CHUTE sw – DEPLOY (if required).
11. HOOK sw – DN (if required).

If brake/JFS accumulator braking is used:

12. Stop straight ahead and engage parking brake. 12C
13. Refer to ACTIVATED EPU/HYDRAZINE LEAK, page F-13.

END

NOTES:

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NOTES:

Fuel/Hydraulic Malfunctions

RED ZONE ON AL POINTER	**FUEL IMBALANCE** **D-5**
FWD FUEL LOW AND/OR AFT FUEL LOW	**FUEL LOW** **D-7**
TOTALIZER AND POINTERS DO NOT AGREE BELOW 5700 (D 4500) LB	**TRAPPED EXTERNAL FUEL** **D-9**
INT WING & CFT QUANTITY GREATER THAN 700 LB AND FUSELAGE FUEL DECREASING AND EXTERNAL TANK EMPTY	**TRAPPED CFT FUEL** **D-21**
ABNORMALLY DECREASING TOTALIZER	**FUEL LEAK** **D-11**
FUEL/OIL HOT	**HOT FUEL/OIL OR GRAVITY FEED** **D-13**

FLAMEOUT LANDING .... **GO TO C-33**

FUEL/HYD
D

HYD/OIL PRESS

FLCS FAULT

ONE HYD PRESS INDICATOR LOW
EPU RUN LIGHT OFF
ISA ALL FAIL PFL

HYD/OIL PRESS

FLCS FAULT

B HYD PRESS INDICATOR LOW
EPU RUN LIGHT ON
ISA ALL FAIL PFL

HYD/OIL PRESS

ELEC SYS

FLCS FAULT

FLCS PMG / MAIN GEN

STBY GEN

B HYD PRESS INDICATOR LOW
EPU RUN LIGHT ON
ISA ALL FAIL PFL

OTHER CONSIDERATIONS:

[1] A fuel imbalance when not carrying an external fuel tank(s) indicates a system malfunction. A fuel imbalance when carrying an external fuel tank(s) may be the result of normal system operating tolerances.

[2] ● Any correction required per total fuel quantity usage with internal fuel only indicates a system malfunction.

● More than one correction per total fuel quantity usage with either a 300-gallon fuel tank or two 370-gallon fuel tanks indicates a system malfunction.

● More than two corrections per total fuel quantity usage with either a 300-gallon fuel tank and two 370-gallon fuel tanks or two 600-gallon fuel tanks indicate a system malfunction.

● More than three corrections per total fuel quantity usage with a 300-gallon fuel tank and two 600-gallon fuel tanks indicate a system malfunction.

● Placing the ENG FEED knob to either FWD or AFT during external tank fuel transfer may cause some fuel to enter empty CFT's.

[3][W] Limit fuel flow to the min required to sustain flight while the cause is determined. Avoid negative g flight when either reservoir is not full.

[4][W] Aft fuel heavy (red portion of AL pointer showing) results in increased susceptibility to departure and deep stall conditions. Limit AOA and avoid max command rolling maneuvers.

[5] Indicated by abnormally high fuel flow, by totalizer decreasing at abnormal rate, or by visual means.

[6] Use the FUEL QTY SEL knob to determine if a trapped fuel condition exists. Refer to TRAPPED EXTERNAL FUEL, page D-9, if required.

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FUEL IMBALANCE 1 2

If fuel imbalance is indicated by AL and FR pointers with FUEL QTY SEL knob in NORM:

1. Fuel flow – Reduce to the min required to sustain flight below 6000 pph. 3W

If aft fuel imbalance exists (aft CG):

2. AOA – 15° max. 4W

If a fuel leak is suspected: 5

3. Go to FUEL LEAK, page D-11.

If a fuel leak is not suspected:

4. Fuel quantities – Check. 6

(Cont)

OTHER INDICATIONS:

7 Use only to correct a forward and aft fuselage fuel imbalance and not to correct imbalances between reservoirs. Do not exceed 25,000 pph fuel flow while balancing fuel.

8 C If two-point aerodynamic braking is used with an aft CG, pitch overshoots may occur and the nozzle, speedbrakes, and ventral fins may contact the runway.

9 A NVP TFR FAIL PFL and a fly-up can occur when NORM is reselected while operating in TFR.

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5. ENG FEED knob – FWD or AFT. [7]

If imbalance is not corrected:

6. Land as soon as practical. [8][C]

END

If proper distribution is attained:

6. ENG FEED knob – NORM. [9]
7. Fuel balance – Monitor.

END

OTHER INDICATIONS:

- A fuel low caution light may be caused by a fuel leak, trapped external fuel, trapped CFT fuel, a fuel imbalance between the forward and aft systems, prolonged AB operation, or a fuel sensing problem.
- The FWD FUEL LOW and AFT FUEL LOW caution lights indicate reservoir tank quantities are less than:

	C		D
FWD	400 pounds	FWD	250 pounds
AFT	250 pounds	AFT	400 pounds

OTHER CONSIDERATIONS:

1 W Limit fuel flow to the min required to sustain flight while the cause of the fuel low light(s) is determined. Avoid negative g flight when either reservoir is not full.

2 A NVP TFR FAIL PFL and a fly-up can occur when NORM is reselected while operating in TFR.

3 Leave FUEL QTY SEL knob out of NORM if FUEL quantity indicator displays erroneous information.

4 Fuel flow indications may fluctuate with either reservoir empty.

5 Consider an SFO. Refer to FLAMEOUT LANDING, page C-33.

6 Indicated by abnormally high fuel flow, by totalizer decreasing at abnormal rate, or by visual means.

FUEL LOW

If FWD FUEL LOW and/or AFT FUEL LOW caution light illuminates:

1. Fuel flow – Reduce to the min required to sustain flight below 6000 pph. 1 W
2. ENG FEED knob – NORM. 2
3. FUEL QTY SEL knob – RSVR. 3

If either or both reservoir tanks are low: 4

4. Land as soon as possible. 5

If a fuel leak is suspected: 6

5. Go to FUEL LEAK, page D-11.

(Cont)

If reservoir tanks indicate full:

4. FUEL QTY SEL knob – TEST.

If AL and/or FR pointers test bad, or FUEL quantity indicator is inoperative:

5. Land as soon as possible. 5

(Cont)

OTHER CONSIDERATIONS:

[7] A fuel line between the reservoir and FFP may be ruptured, causing fuel to cycle between tanks in the same system.

[8] Monitor reservoir tanks to insure they are maintained full.

If external fuel has not transferred:

6. Go to TRAPPED EXTERNAL FUEL, page D-9.

If CFT fuel has not completely transferred:

7. Go to TRAPPED CFT FUEL, page D-21.

If forward and aft fuselage fuel is not properly balanced:

8. Go to FUEL IMBALANCE, page D-5.

If fuel is properly balanced: 7

9. Land as soon as possible.

END

If AL and FR pointers test good:

6. Individual fuel quantities – Check and compare with totalizer. 8
7. Land as soon as practical.

END

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OTHER CONSIDERATIONS:

1 W ● A TRP FUEL indication in the HUD may be a symptom of an external fuel leak. If a fuel leak is suspected (indicated by abnormally high fuel flow, by totalizer decreasing at abnormal rate, or by visual means), refer to FUEL LEAK, page D-11.

● With trapped external fuel, the totalizer does not indicate total usable fuel. Usable fuel is the totalizer quantity less the external fuel quantity.

2 If either INT WING & CFT indication is greater than 700 lb and an external tank is empty, go to TRAPPED CFT FUEL, page D-21.

3 Repeating or undoing any steps may delay transfer.

4 This action usually increases ECS air pressure for external fuel transfer.

5 Selecting WING FIRST bypasses electrical components that, if malfunctioning, can prevent fuel transfer from external wing tanks, the centerline tank, or all three external tanks. With a three tank configuration, the first indication that the centerline tank is feeding is after the external wing tanks are emptied.

6 A NVP TFR FAIL PFL and a fly-up can occur when NORM is reselected while operating in TFR.

7 Open or close AR door at or below 400 kts/0.85 mach.

8 The time required to observe fuel transfer if the malfunction is corrected can vary from 1-3 minutes (for a full centerline tank) to 10-12 minutes (for three external tanks with 500 lb fuel in each) if reservoir tanks are full (i.e., both air ejectors are off).

9 W If a trapped external fuel condition is not discovered until either reservoir tank is less than full or a fuel low light is on, sufficient fuel transfer from the external tank(s) may not occur even if the malfunction is corrected. Consider fuselage fuel to be the only usable fuel.

10 If trapped external fuel occurs after air refueling and completion of checklist steps did not correct the malfunction, consider descending well below the freezing level to unfreeze the external pressurization and vent valve. Cycling the AR door at lower altitude may restore normal operation.

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TRAPPED EXTERNAL FUEL 1W 2

Accomplish steps 1 through 8 and 9 (if required) without delay: 3

1. Fuel flow – Minimize.
2. AIR REFUEL sw – Confirm in CLOSE.
3. AIR SOURCE knob – Confirm in NORM or DUMP.
4. TEMP knob – MAN and adjust for comfort. 4
5. TANK INERTING sw – TANK INERTING to reduce internal tank pressurization.
6. EXT FUEL TRANS sw – WING FIRST. 5
7. ENG FEED knob – NORM. 6
8. Stick – Pulse aircraft in pitch several times by applying differential g forces of approx ± 2g.

If the AIR REFUEL sw was initially found in CLOSE (step 2), perform step 9. If the AIR REFUEL sw was initially found in OPEN (step 2), omit step 9.

9. AIR REFUEL sw – OPEN (1 sec), then CLOSE. 7
10. External tank fuel quantity – Monitor. 8 9W 10
11. Stores – Jettison (if required).

END

7 1/2 ″ Page

OTHER CONSIDERATIONS:

1 Indicated by abnormally high fuel flow, by totalizer decreasing at abnormal rate, or by visual means.

2 If a suitable landing field is not within gliding distance, consider increasing airspeed and altitude (without the use of AB) to maximize range by using fuel which would otherwise be lost.

3 W Avoid negative g flight when either reservoir is not full.

4 Leak is in the engine feed line or engine components.

5 Consider stores jettison if range is critical. Consider an SFO. Refer to FLAMEOUT LANDING, page C-33.

6 A NVP TFR FAIL PFL and a fly-up can occur when NORM is reselected while operating in TFR.

7 This action stops automatic forward fuel transfer.

8 Consider stores jettison if range is critical.

9 W Aft fuel heavy (red portion of AL pointer showing) results in increased susceptibility to departure and deep stall conditions. Limit AOA and avoid max command rolling maneuvers.

10 C If two-point aerodynamic braking is used with an aft CG, pitch overshoots may occur and the nozzle, speedbrakes, and ventral fins may contact the runway.

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FUEL LEAK

If a fuel leak is suspected: [1]

1. Range – Maximize. [2] [3W]

If fuel flow is abnormally high:

2. ENG FEED knob – OFF. [4]
3. Land as soon as possible. [5]

END

If fuel flow is normal:

2. ENG FEED knob – NORM. [6]

If leak is from the forward system:

3. FUEL QTY SEL knob – Out of NORM. [7]

If external tanks contain fuel:

4. TANK INERTING sw – TANK INERTING to reduce internal tank pressurization.

If external tanks are not installed or when they are empty:

5. AIR REFUEL sw – OPEN.
6. Land as soon as possible. [8]

If aft fuel imbalance exists (aft CG):

7. AOA – 15° max. [9W] [10C]

END

OTHER INDICATIONS:

- Main and standby generator failure with either hydraulic system A or FFP failure.

OTHER CONSIDERATIONS:

1 W ● Engine flameout may occur at low fuel flow rates when in a hot fuel situation.

● Engine flameout may occur when either reservoir tank empties if a gravity feed condition exists.

2 Minimize aircraft maneuvering for duration of flight.

3 Consider an SFO. Refer to FLAMEOUT LANDING, page C-33.

7 3/4 " Page

HOT FUEL/OIL OR GRAVITY FEED

If FUEL/OIL HOT caution light illuminates or gravity feed situation exists: 1 W

1. AIR REFUEL sw – Check CLOSE.
2. TANK INERTING sw – Check OFF.
3. Altitude – 10,000 ft max (if practical). 2
4. Fuel flow – 4000 pph min until landing is assured when in a hot fuel situation.

If FUEL/OIL HOT caution light goes off:

5. Land as soon as practical.

END

If FUEL/OIL HOT caution light remains on or gravity feed situation exists:

5. Land as soon as possible. 3

END

INOPERATIVE EQUIPMENT:

- HYD SYS A – Speedbrakes, FFP.
- HYD SYS B – Normal braking, NWS, AR door, gun, normal LG extension.

OTHER INDICATIONS:

- A hydraulic system failure is indicated by illumination of the HYD/OIL PRESS warning light, FLCS FAULT caution light, and ISA ALL FAIL PFL.

OTHER CONSIDERATIONS:

1 W If hydraulic failure is due to structural damage (e.g., battle damage, midair collision, bird strike, fire, or hard landing), the other system may be damaged and failure can occur with little warning. The HYD PRESS indicator may show normal pressure until system fluid is depleted.

2 Make smooth control inputs and plan to fly a straight-in approach.

3 Fuel distribution must be controlled manually.

4 EPU RUN light on may indicate a dual hydraulic or PTO shaft failure.

5 Alternate LG extension can be used up to 300 kts; however, the NLG may not fully extend until 190 kts. Time above 190 kts should be minimized in case there is a leak in the pneumatic lines.

6 C ● NWS is not available following alternate LG extension.

● Do not depress the ALT GEAR reset button while pulling the ALT GEAR handle. This action may preclude successful LG extension.

7 W If LG handle does not lower, select BRAKES CHAN 2 and position ALT FLAPS sw to EXTEND. Nozzle remains closed, resulting in higher than normal landing thrust.

8 Braking is available using brake/JFS accumulators only. To avoid brake activation and loss of brake/JFS accumulator pressure, do not rest feet on brake pedals. If the brake/JFS accumulators are depleted or if directional control may be a problem, consider an approach-end arrestment. Refer to CABLE ARRESTMENT, page F-11.

9 C ● Brakes should be applied in a single, moderate, and steady application without cycling the antiskid.

● Brake pedal deflection of 1/16 inch activates the brakes and bleeds the brake/JFS accumulators. To avoid brake activation and loss of brake/JFS accumulator pressure, do not rest feet on brake pedals.

● Do not attempt to taxi clear of the runway. Loss of brake/JFS accumulator pressure results in the inability to stop or steer the aircraft.

SINGLE HYDRAULIC FAILURE [1][W]

System A Failure

1. Land as soon as practical. [2]
2. System B HYD PRESS indicator – Monitor.
3. Fuel balance – Monitor. [3]

System B Failure [4]

1. Land as soon as practical. [2]
2. ALT GEAR handle – Pull (190 kts max, if practical). [5] [6][C]
3. LG handle – DN. (Use DN LOCK REL button if required.) [7][W]
4. HOOK sw – DN (if required). [8]

After landing:

5. Stop straight ahead and engage parking brake. [9][C]

END

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OTHER CONSIDERATIONS:

- Sluggishness or lack of response to flight control inputs; decreasing hydraulic pressures.
- A hydraulic system failure is indicated by illumination of the HYD/OIL PRESS warning light, FLCS FAULT caution light, and ISA ALL FAIL PFL.

MAJOR INOPERATIVE EQUIPMENT:

- HYD SYS B – Normal braking, NWS, AR door, gun, and normal LG extension.

OTHER CONSIDERATIONS:

[1] Before landing, confirm that the EPU operates (EPU run light on) with the throttle in IDLE. If the EPU run light goes off, refer to ABNORMAL EPU OPERATION, page A-17.

[2] Make smooth control inputs and plan to fly a straight-in approach.

[3] Alternate LG extension can be used up to 300 kts; however, the NLG may not fully extend until 190 kts. Time above 190 kts should be minimized in case there is a leak in the pneumatic lines.

[4] [C] ● NWS is not available following alternate LG extension.

● Do not depress the ALT GEAR reset button while pulling the ALT GEAR handle. This action may preclude successful LG extension.

[5] [W] If LG handle does not lower, select BRAKES CHAN 2 and position ALT FLAPS sw to EXTEND. Nozzle remains closed, resulting in higher than normal landing thrust.

[6] Braking is available using brake/JFS accumulators only. To avoid brake activation and loss of brake/JFS accumulator pressure, do not rest feet on brake pedals. If the brake/JFS accumulators are depleted or if directional control may be a problem, consider an approach-end arrestment. Refer to CABLE ARRESTMENT, page F-11.

[7] [C] ● Brakes should be applied in a single, moderate, and steady application without cycling the antiskid.

● Brake pedal deflection of 1/16 inch activates the brakes and bleeds the brake/JFS accumulators. To avoid brake activation and loss of brake/JFS accumulator pressure, do not rest feet on brake pedals.

● Do not attempt to taxi clear of the runway. Loss of brake/JFS accumulator pressure results in the inability to stop or steer the aircraft.

DUAL HYDRAULIC FAILURE

1. EPU sw – ON (if EPU run light is off).
2. System A HYD PRESS indicator – Check pressure increasing.

If hydraulic pressure does not increase or control response is lost:

3. Eject.

If system A hydraulic pressure is restored:

3. EPU run light – Check light on at idle thrust. [1]
4. Land as soon as possible. [2]
5. ALT GEAR handle – Pull (190 kts max, if practical). [3] [4][C]
6. LG handle – DN. (Use DN LOCK REL button if required.) [5][W]
7. HOOK sw – DN (if required). [6]

After landing:

8. Stop straight ahead and engage parking brake. [7][C]
9. Refer to ACTIVATED EPU/HYDRAZINE LEAK, page F-13.

END

MAJOR INOPERATIVE EQUIPMENT:

- MAIN GEN – FCR, MFD's, FCC.
- HYD SYS B – Normal braking, NWS, AR door, gun, and normal LG extension.
- STBY GEN/FLCS PMG.
- Go to EMERGENCY POWER DISTRIBUTION, page A-20, for other systems lost.

OTHER CONSIDERATIONS:

1 C Stall protection may be lost. Do not retard throttle below MIL until subsonic.

2 If warning flag(s) is in view, refer to EGI FAILURE, page F-29.

3 Before landing, confirm that the EPU operates (EPU run light on) with the throttle in IDLE. If the EPU run light goes off, refer to ABNORMAL EPU OPERATION, page A-17.

4 Make smooth control inputs and plan to fly a straight-in approach.

5 Alternate LG extension can be used up to 300 kts; however, the NLG may not fully extend until 190 kts. Time above 190 kts should be minimized in case there is a leak in the pneumatic lines.

6 C ● NWS is not available following alternate LG extension.

● Do not depress the ALT GEAR reset button while pulling the ALT GEAR handle. This action may preclude successful LG extension.

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SYSTEM B AND GENERATOR FAILURE (PTO SHAFT)

1. EPU sw – ON (if EPU run light is off).

If EPU run light is off and control response is lost:

2. Eject.

If EPU run light is on:

3. Throttle – As required. 1 C
4. ADI – Check for presence of OFF and/or AUX warning flags. 2
5. Fuel balance – Monitor.
6. EPU run light – Check light on at idle thrust. 3
7. Land as soon as possible. 4
8. ALT GEAR handle – Pull (190 kts max, if practical). 5 6 C

(Cont)

OTHER CONSIDERATIONS:

7 W If LG handle does not lower, select BRAKES CHAN 2 and position ALT FLAPS sw to EXTEND. Nozzle remains closed, resulting in higher than normal landing thrust.

8 Braking is available using brake/JFS accumulators only. To avoid brake activation and loss of brake/JFS accumulator pressure, do not rest feet on brake pedals. If the brake/ JFS accumulators are depleted or if directional control may be a problem, consider an approach-end arrestment. Refer to CABLE ARRESTMENT, page F-11.

9 C ● Brakes should be applied in a single, moderate, and steady application without cycling the antiskid.

● Brake pedal deflection of 1/16 inch activates the brake/JFS accumulators. To avoid brake activation and loss of accumulator fluid, do not rest feet on the brake pedals.

● Do not attempt to taxi clear of the runway. Loss of brake/JFS accumulator pressure results in the inability to stop or steer the aircraft.

9. LG handle – DN. (Use DN LOCK REL button if required.) 7 W
10. HOOK sw – DN (if required). 8

After landing:

11. Stop straight ahead and engage parking brake. 9 C
12. EPU sw – OFF.
13. Refer to ACTIVATED EPU/HYDRAZINE LEAK, page F-13.

END

OTHER CONSIDERATIONS:

1 W ● With trapped CFT fuel, the totalizer does not indicate usable fuel. Until fuel transfer can be established, fuselage fuel is the only available usable fuel.

● If a trapped CFT fuel condition is not discovered until either reservoir tank is less than full or a fuel low light is on, sufficient fuel transfer from the CFT may not occur even if the malfunction is corrected. Consider fuselage fuel to be the only usable fuel.

2 If INT WING & CFT quantity remains greater than 700 lb and fuselage fuel is decreasing and an external tank is empty, fuel is trapped in the CFT.

3 Open or close AR door at or below 400 kts/0.85 mach.

4 Opening the AR door for 1 min vents pressure that may prevent transfer of CFT fuel.

5 Opening the AR door depressurizes external tanks and removes the cause of trapped CFT fuel. It may take from 1 min (centerline tank) to 4 min (centerline tank and two 600-gallon fuel tanks) for external tank air pressure to decrease to zero. With the air source removed, CFT fuel can be transferred. The wing turbine pump capability limits the transfer rate of CFT fuel from the internal wings to the fuselage.

6 The time required to observe fuel transfer can vary from 10-25 min after AR door is opened. Because CFT fuel is combined with internal wing fuel, the INT WING & CFT quantity will not immediately decrease. As fuel transfers, the INT WING & CFT quantity indication may be very erratic with jumps of 200 lb. CFT fuel transfer is best determined by observing a reduction in fuselage fuel usage or an increase in fuselage fuel.

7 If no fuel transfer is apparent after 10 min with AR door open, consider descending. A descent of 1/3 of the altitude available may speed up the process by increasing air pressure behind the CFT fuel.

8 Closing the AR door repressurizes the external tank(s). Repessurization may be slow because of the failed external tank and may not be sufficient to obtain normal external tank transfer rate. With EXT TANK TRANS sw in CFT FIRST / NO FILL, the CFT's will remain empty.

9 Jettison of the failed empty external tank will immediately remove the source of air trapping the CFT fuel. Jettison does not improve the fuel transfer rate. However, once the failed tank is removed, the AR door can be closed so that the fuel system pressure will increase and improve the CFT transfer rate. Fuel in any remaining external tank(s) may also transfer to fill the internal wing.

TRAPPED CFT FUEL 1 W

1. Fuel flow – Minimize.
2. EXT FUEL TRANS sw – CFT FIRST / NO FILL.
3. FUEL QTY SEL knob – Check all positions. 2

If FWD FUEL LOW and/or AFT FUEL LOW caution light is on:

4. Stores – Retain any external tank containing fuel; jettison any empty external tank and other stores. Refer to JETTISON, page F-27.
5. AIR REFUEL sw – OPEN for 1 min then CLOSE. 3 4

If FWD FUEL LOW and AFT FUEL LOW caution lights are off:

4. AIR REFUEL sw – OPEN. 3 5
5. Fuel quantities – Monitor. 6 7

When each INT WING & CFT quantity is less than 200 LB:

6. AIR REFUEL sw – CLOSE. 8

If fuselage fuel is not sufficient to recover the aircraft: 9

7. Jettison empty external tank(s).
8. AIR REFUEL sw – CLOSE.

END

NOTES:

NOTES:

LG

E

Landing Gear Malfunctions

NOTES:

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OTHER CONSIDERATIONS:

1 TO/LDG CONFIG light is on if left MLG WOW sw has failed.

2 W If LG handle does not lower, select BRAKES CHAN 2 and position ALT FLAPS sw to EXTEND. Nozzle remains closed, resulting in higher than normal landing thrust.

3 C Touchdown antiskid protection may not be available. Landing with feet on the brake pedals may result in blown tire(s).

LG HANDLE WILL NOT RAISE

If conditions permit:

1. Airspeed – 300 kts max.
2. GW – Reduce prior to landing.

If LG must be raised:

1. LG handle DN LOCK REL button – Depress.
2. LG handle – UP. [1]

When desired:

3. LG handle – DN. (Use DN LOCK REL button if required.) [2][W]

After touchdown:

4. Brakes – Apply after wheels spin up. [3][C]

END

OTHER CONSIDERATIONS:

1 W If LG handle does not lower, select BRAKES CHAN 2 and position ALT FLAPS sw to EXTEND. Nozzle remains closed, resulting in higher than normal landing thrust.

2 C Do not cycle the LG handle. Damage to LG or LG doors may result.

3 W Aborting takeoff at high speed with a blown tire may be more dangerous than continuing takeoff. For heavy weight takeoffs, an abort at high speed with a blown tire is extremely dangerous because braking and directional control are impaired.

4 The decision to take off or abort depends on the speed at the time of the failure, GW, stopping distance required, and arresting gear availability.

5 W If a blown NLG tire occurred and NWS is not available, it may not be possible to prevent departure from the runway. A reverse castering effect may occur in which the nosewheel moves opposite to the rudder or differential braking input.

6 C With a blown tire, avoid centerline lights as they may cause wheel damage and subsequent loss of directional control. Failure to use full aft stick with a blown NLG tire may lead to wheel failure and directional control problems.

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LG FAILS TO RETRACT

1. Airspeed – 300 kts max.
2. LG handle – DN. (Use DN LOCK REL button if required.) 1W

If LG comes down normally:

3. GW – Reduce prior to landing.

If LG does not indicate down: 2C

4. Go to ALTERNATE LG EXTENSION, page E-13.

BLOWN TIRE ON TAKEOFF 3W 4 5W 6C

If takeoff is not feasible:

1. Abort.

If takeoff is continued:

1. LG – Do not retract.
2. Airspeed – 300 kts max.
3. Refer to LANDING WITH A BLOWN TIRE, page E-9.

END

OTHER CONSIDERATIONS:

1 C With a blown tire, avoid centerline lights as they may cause wheel damage and subsequent loss of directional control.

2 Retain empty external fuel tanks.

3 W Failure to depressurize external fuel tank(s) significantly increases the probability of tank explosion and fire if the aircraft departs the runway.

4 Delay placing the AIR REFUEL sw to OPEN until all external tanks are empty.

5 Use of antiskid minimizes skidding on good tire during braking.

6 An approach-end arrestment is recommended. Refer to CABLE ARRESTMENT, page F-11.

7 If no approach-end cable is available, land on the side of runway away from the blown tire.

8 The NWS light does not illuminate when NWS is engaged if the AIR REFUEL sw is in OPEN.

9 Plan to land with approx 1500 lb of fuel on board.

10 At 3000 lb fuel remaining, place ENG FEED knob to FWD. When forward reservoir is empty, place ENG FEED knob to NORM. (Emptying forward tank system takes approx C 15 minutes, D 9 minutes if fuel flow is 4000 pph. When forward tank system empties, the fuel in aft tank system is approx C 2000 lb, D 2400 lb.)

11 W Failure to depressurize external fuel tank(s) significantly increases the probability of tank explosion and fire if the nose gear collapses during the arrestment.

12 An approach-end cable arrestment with the nosewheel off the runway is recommended. Refer to CABLE ARRESTMENT, page F-11.

LANDING WITH A BLOWN TIRE 1C

Landing With A Blown Main Gear Tire

Prior to landing:

1. Stores – Jettison. Refer to JETTISON, page F-27. 2
2. GW – Reduce (if practical).
3. TANK INERTING sw – TANK INERTING even if Halon is not available.
4. AIR REFUEL sw – OPEN, if external fuel tank(s) is installed. 3W 4
5. ANTI-SKID sw – ANTI-SKID. 5
6. HOOK sw – DN. 6
7. Final approach AOA – 13°.

If a missed approach-end cable arrestment occurs or no approach-end cable is available: 7

8. NWS – Engage (if required). 8
9. Brake – As desired on good tire.

Landing With A Blown Nose Gear Tire

Prior to landing:

1. Stores – Jettison. Refer to JETTISON, page F-27. 2
2. GW – Reduce (if practical). 9
3. Fuel distribution – All fuel in aft tank system (if practical). 10
4. TANK INERTING sw – TANK INERTING even if Halon is not available.
5. AIR REFUEL sw – OPEN, if external fuel tank(s) is installed. 11W
6. HOOK sw – DN. 12
7. Final approach AOA – 13°.

(Cont)

OTHER CONSIDERATIONS:

13 W With a blown NLG tire and loss of NWS, it may not be possible to prevent departure from the runway. A reverse castering effect may occur in which the nosewheel moves opposite to the rudder or differential braking input.

14 The max allowable fuel flow with one reservoir empty is 25,000 pph.

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After touchdown:

8. Stick – Lower nose to approx 5° pitch attitude for arrestment.

After cable engagement:

9. Stick – Apply aft stick after nose starts down to reduce load on the NLG.

If a missed cable engagement occurs:

10. Maintain pitch attitude and go around. 13W 14

END

OTHER CONSIDERATIONS:

1 Nozzle remains closed, resulting in higher than normal landing thrust.

2 After a successful alternate gear extension with the landing gear handle still up, the LG handle warning light remains on to indicate the position of the gear handle is not in agreement with the actual gear position.

3 If alternate LG extension was performed and one or more LG indicate unsafe, refer to ALTERNATE LG EXTENSION, page E-13.

4 C If the LG previously failed to retract, do not cycle the LG handle. Damage to the LG or LG doors may preclude successful extension.

5 W If at anytime, an LG intermittently indicates unsafe (i.e. WHEELS down light off and LG handle warning light on), the overcenter lock on the LG drag brace assembly may not be functioning properly. The LG may appear down, but the LG may collapse during landing. Plan on using the LG unsafe/up procedures even if the LG eventually indicates normal. Refer to LANDING WITH LG UNSAFE/UP, this section.

6 C If the LG previously failed to retract, do not cycle the LG handle. Damage to the LG or LG doors may preclude successful extension.

7 If the NLG WHEELS down light is off, confirmation of the NLG position can be made by checking landing/taxi light operation. Illumination of either light confirms that the NLG is down. With the NLG WHEELS down light off, NWS may be inoperative (without a NWS FAIL caution light).

8 From the front cockpit, the top of the speedbrakes should be slightly above a line drawn from the tip of the horizontal tail to the top of the vertical tail root fairing.

9 C If RMLG WHEELS down light is off, speedbrakes may not be limited to 43°.

LG HANDLE WILL NOT LOWER

If LG handle cannot be lowered normally:

1. DN LOCK REL button – Depress and lower LG handle.

If LG handle still cannot be lowered:

2. ALT FLAPS sw – EXTEND.
3. BRAKES channel sw – CHAN 2.
4. Go to ALTERNATE LG EXTENSION, page E-13. [1] [2]

LG FAILS TO EXTEND [3] [4C]

If one or more LG indicate unsafe: [5W] [6C] [7]

1. LG handle – Cycle and monitor LG handle warning light and WHEELS down lights.

If LG handle warning light came on when the LG handle was lowered, then went off, and tests good or if WHEELS down lights operated normally:

2. Speedbrakes – Verify opening is less than 43°. [8] [9C]
3. Land normally.

If LG handle warning light did not illuminate or remained illuminated after LG handle was lowered and if one or more WHEELS down lights did not illuminate:

4. Go to ALTERNATE LG EXTENSION, page E-13.

END

OTHER CONSIDERATIONS:

1 W ● Do not delay lowering LG below 2000 feet AGL.

● If LG handle does not lower, select BRAKES CHAN 2 and position ALT FLAPS sw to EXTEND. Nozzle remains closed, resulting in higher than normal landing thrust.

2 • Alternate LG extension can be used up to 300 kts; however, the NLG may not fully extend until 190 kts. Time above 190 kts should be minimized in case there is a leak in the pneumatic lines.

• If an unsafe MLG indication exists and both MLG are out of the wheel wells, pulling the ALT GEAR handle is not recommended.

3 C ● NWS is not available following alternate LG extension.

● Do not depress the ALT GEAR reset button while pulling the ALT GEAR handle. This action may preclude successful LG extension.

● Pulling the ALT GEAR handle with normal system B hydraulic pressure, e.g., NLG fails to extend, may result in hydraulic system B failure within 15 minutes.

4 If possible, get visual confirmation of LG position. If all WHEELS down lights were initially off with the LG handle down and use of the hook may be required after touchdown, verify before landing that the hook extends.

5 C If the LG was alternately extended due to failure of system B, only brake/JFS accumulator braking is available and after stopping, the parking brake should be engaged until chocks are installed.

6 Up to 300 kts may be required to provide sufficient g force.

7 If possible, get visual confirmation of LG position.

8 From the front cockpit, the top of the speedbrakes should be slightly above a line drawn from the tip of the horizontal tail to the top of the vertical tail root fairing.

9 C If RMLG WHEELS down light is off, speedbrakes may not be limited to 43°.

ALTERNATE LG EXTENSION

1. LG handle – DN. (Use DN LOCK REL, if required.) 1W
2. ALT GEAR handle – Pull (if required) (190 kts, if practical). 2 3C

If LG indicates safe:

3. Land normally. 4
4. Stop straight ahead on the runway. 5C

If LG indicates unsafe:

3. Stick – Apply alternating g forces (−1.0 to +3.0g) to free LG. 6

If LG indicates safe:

4. Land normally. 7
5. Stop straight ahead on the runway. 5C

If LG still indicates unsafe:

4. Speedbrakes – Verify opening is less than 43°. 8 9C
5. Go to LANDING WITH LG UNSAFE/UP, page E-15.

END

OTHER CONSIDERATIONS:

1 Prior to landing with any of the LG unsafe or up, consider the following:

- Airfield facilities.
- Hook engagement limits.
- Crosswind component.
- Runway and overrun conditions.

2 W If time permits, delay landing until external fuel tanks are empty. If an immediate landing is required, jettison all external fuel tanks.

3 W Failure to depressurize external fuel tanks significantly increases the probability of tank explosion and fire.

4 Delay placing the AIR REFUEL sw to OPEN until all external fuel tanks are empty.

5 If either MLG is not extended, EPU operation cannot be terminated with the EPU sw after engine shutdown.

LANDING WITH LG UNSAFE/UP 1

If conditions are not favorable:

1. Refer to EJECTION (TIME PERMITTING), page F-23.

To accomplish the landing:

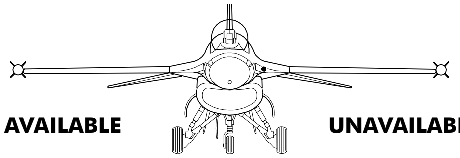
1. Retain empty fuel tanks and racks. 2W
2. Armament – Jettison.
3. GW – Reduce.
4. TANK INERTING sw – TANK INERTING even if Halon is not available.
5. AIR REFUEL sw – OPEN. 3W 4
6. FCR – OFF.
7. ST STA/HDPT/ECM power – Off.
8. SHOULDER HARNESS knob – LOCKED.
9. Go to page E-16. 5

(Cont)

LG Unsafe/Up Landing

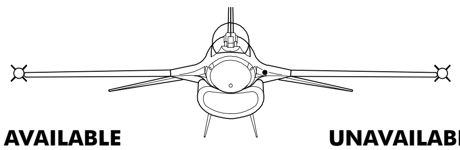
APPROACH-END ARRESTMENT

ALL LG INDICATE UNSAFE
BUT APPEAR NORMAL



AVAILABLE	**UNAVAILABLE**
10. HOOK – DOWN. 11. APPROACH-END CABLE – ENGAGE.	10. LAND NORMALLY.

ALL LG UP

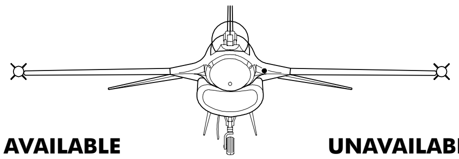


AVAILABLE	**UNAVAILABLE**
ARRESTMENT NOT RECOMMENDED. USE APPROACH-END ARRESTMENT UNAVAILABLE PROCEDURE.	10. EPU – ON. 11. ALT FLAPS – EXTEND. 12. LOW ANGLE APPROACH AT 13° AOA. 13. THROTTLE – OFF IMMEDIATELY PRIOR TO TOUCHDOWN.

LG Unsafe/Up Landing

APPROACH-END ARRESTMENT

BOTH MLG UP OR UNSAFE

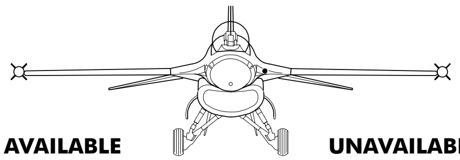


AVAILABLE	**UNAVAILABLE**
10. ALT GEAR HANDLE – IN. 11. WAIT 5 SEC. 12. LG HANDLE – UP. 13. ALT GEAR RESET BUTTON – DEPRESS (2 SEC). 14. USE ALL LG UP PROCEDURE. 15. IF NLG DOES NOT RETRACT: a. HOOK – DOWN. b. LOW ANGLE APPROACH AT 11° AOA. c. ATTEMPT A FLY-IN ENGAGEMENT. d. THROTTLE – OFF AFTER ENGAGEMENT. **WARNING** IF THE ENGAGEMENT IS MISSED, MAINTAIN WINGS LEVEL AND GO AROUND. IF A GO-AROUND IS NOT ACCOMPLISHED, THE AIRCRAFT MAY GROUND LOOP.	10. ALT GEAR HANDLE – IN. 11. WAIT 5 SEC. 12. LG HANDLE – UP. 13. ALT GEAR RESET BUTTON – DEPRESS (2 SEC). 14. USE ALL LG UP PROCEDURE. 15. IF NLG DOES NOT RETRACT: a. CONSIDER LANDING FROM LOW ANGLE APPROACH AT 13° AOA IF WING FUEL TANKS ARE CARRIED. b. RECOMMEND EJECTION IF WING FUEL TANKS ARE NOT CARRIED OR IF CONDITIONS ARE NOT CONSIDERED FAVORABLE FOR AN ATTEMPTED LANDING WITH WING FUEL TANKS.

LG Unsafe/Up Landing

APPROACH-END ARRESTMENT

NLG UP OR UNSAFE

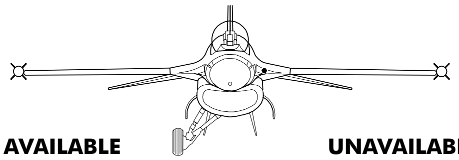


AVAILABLE	**UNAVAILABLE**
ARRESTMENT NOT RECOMMENDED. USE APPROACH-END ARRESTMENT UNAVAILABLE PROCEDURE.	10. EPU – ON. 11. LOW ANGLE APPROACH AT 13° AOA. 12. THROTTLE – OFF AFTER TOUCHDOWN. 13. LOWER NOSE TO RUNWAY BEFORE CONTROL EFFECTIVENESS BEGINS TO DECAY. 14. EPU – OFF AFTER STOP.

LG Unsafe/Up Landing

APPROACH-END ARRESTMENT

ONE MLG AND NLG UP OR UNSAFE

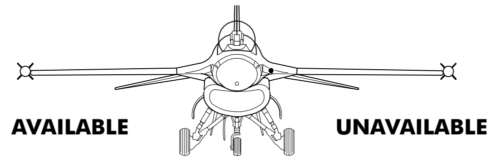


AVAILABLE	**UNAVAILABLE**
ARRESTMENT NOT RECOMMENDED. USE APPROACH-END ARRESTMENT UNAVAILABLE PROCEDURE.	10. ALT GEAR HANDLE – IN. 11. WAIT 5 SEC. 12. LG HANDLE – UP. 13. ALT GEAR RESET BUTTON – DEPRESS (2 SEC). 14. USE ALL LG UP PROCEDURE. 15. IF LG DOES NOT RETRACT: a. CONSIDER LANDING FROM A LOW ANGLE APPROACH AT 13° AOA IF EXTERNAL FUEL TANK(S) IS CARRIED. **NOTE** LAND ON SIDE OF RUNWAY AWAY FROM THE UNSAFE MLG. b. RECOMMEND EJECTION IF EXTERNAL FUEL TANK(S) IS NOT CARRIED OR IF CONDITIONS ARE NOT CONSIDERED FAVORABLE FOR AN ATTEMPTED LANDING WITH EXTERNAL FUEL TANK(S).

LG Unsafe/Up Landing

APPROACH-END ARRESTMENT

ONE MLG INDICATES UNSAFE
BUT APPEARS NORMAL



AVAILABLE

10. HOOK – DOWN.
11. LOW ANGLE APPROACH AT 11° AOA.
12. AFTER TOUCHDOWN, USE ROLL CONTROL, IF NECESSARY, TO HOLD WING UP. IF ROLL CONTROL IS NEEDED TO HOLD WING UP, MAINTAIN LANDING ATTITUDE FOR ENGAGEMENT. IF ROLL CONTROL IS NOT NEEDED TO HOLD WING UP, LOWER NOSE FOR ARRESTMENT.
13. THROTTLE – OFF AFTER ENGAGEMENT.

WARNING

IF THE ENGAGEMENT IS MISSED AND ROLL CONTROL WAS NECESSARY TO HOLD WING UP, MAINTAIN WINGS LEVEL AND GO AROUND. IF A GO-AROUND IS NOT ACCOMPLISHED, THE AIRCRAFT MAY GROUND LOOP.

UNAVAILABLE

10. ALT GEAR HANDLE – IN.
11. WAIT 5 SEC.
12. LG HANDLE – UP.
13. ALT GEAR RESET BUTTON – DEPRESS (2 SEC).
14. USE ALL LG UP PROCEDURE.
15. IF LG DOES NOT RETRACT:
    a. CONSIDER LANDING FROM LOW ANGLE APPROACH AT 13° AOA IF EXTERNAL FUEL TANK(S) IS CARRIED.

    NOTE

    LAND ON SIDE OF RUNWAY AWAY FROM THE UNSAFE MLG.

    b. RECOMMEND EJECTION IF EXTERNAL FUEL TANK(S) IS NOT CARRIED OR IF CONDITIONS ARE NOT CONSIDERED FAVORABLE FOR AN ATTEMPTED LANDING WITH EXTERNAL FUEL TANK(S).

LG Unsafe/Up Landing

APPROACH-END ARRESTMENT

ONE MLG UP



AVAILABLE

10. ALT GEAR HANDLE – IN.
11. WAIT 5 SEC.
12. LG HANDLE – UP.
13. ALT GEAR RESET BUTTON – DEPRESS (2 SEC).
14. USE ALL LG UP PROCEDURE.
15. IF LG DOES NOT RETRACT:
    a. HOOK – DOWN.
    b. LOW ANGLE APPROACH AT 11° AOA.
    c. AFTER TOUCHDOWN, USE ROLL CONTROL TO HOLD WING UP AND MAINTAIN LANDING ATTITUDE FOR ENGAGEMENT.
    d. THROTTLE – OFF AFTER ENGAGEMENT.

WARNING

IF THE ENGAGEMENT IS MISSED, MAINTAIN WINGS LEVEL AND GO AROUND. IF A GO-AROUND IS NOT ACCOMPLISHED, THE AIRCRAFT MAY GROUND LOOP.

UNAVAILABLE

10. ALT GEAR HANDLE – IN.
11. WAIT 5 SEC.
12. LG HANDLE – UP.
13. ALT GEAR RESET BUTTON – DEPRESS (2 SEC).
14. USE ALL LG UP PROCEDURE.
15. IF LG DOES NOT RETRACT:
    a. CONSIDER LANDING FROM LOW ANGLE APPROACH AT 13° AOA IF EXTERNAL FUEL TANK(S) IS CARRIED.

NOTE

LAND ON SIDE OF RUNWAY AWAY FROM THE UNSAFE MLG.

    b. RECOMMEND EJECTION IF EXTERNAL FUEL TANK(S) IS NOT CARRIED OR IF CONDITIONS ARE NOT CONSIDERED FAVORABLE FOR AN ATTEMPTED LANDING WITH EXTERNAL FUEL TANK(S).

NOTES:

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NOTES:

Miscellaneous

MISC F

5 ″ Page

OTHER CONSIDERATIONS:

1 W ● When braking absorbs a high amount of energy, do not shut down engine until firefighting equipment is available and do not use the parking brake.

● Hot wheels and brakes may ignite leaking hydraulic fluid. Wheel fusible plugs may relieve tire pressure within 15 minutes after stop.

2 W When the throttle is retarded to IDLE from MAX AB, the thrust and rpm decay to idle can take up to 2-4 seconds. Do not mistake high thrust/rpm for failure of the engine to respond to the idle command. Engine shutdown from MAX AB may result in a tailpipe fire.

3 W The hook may miss the cable if the aircraft is not slow enough to compress the MLG struts sufficiently to make WOW or if forward stick pressure is held.

4 With engine shut down, NWS is lost and EPU does not activate automatically. After hydraulic pressure drops, braking is available using the brake/JFS accumulators only. Stop straight ahead and engage parking brake.

5 ″ Page

ABORT 1 W

1. Throttle – IDLE. 2 W
2. DRAG CHUTE sw – DEPLOY (if required).
3. Wheel brakes – Apply (as required).
4. HOOK sw – DN (if required). 3 W

If on fire:

5. Throttle – OFF. 4
6. FUEL MASTER sw – OFF.

END

5 1/4 ″ Page

OTHER CONSIDERATIONS:

1 W Exit over the left side (conditions permitting) to avoid EPU exhaust gases.

2 W ● D Consider canopy jettison so rear seat occupant can egress more rapidly.

● Opening the canopy with the MANUAL CANOPY CONTROL handcrank is extremely difficult. If immediate egress is required, the canopy should be jettisoned rather than opened with the handcrank.

3 W ● If jettison is unsuccessful, heat, blast, and toxic gas from the rockets may enter the cockpit.

● To prevent the flow of oxygen into the cockpit after the oxygen hose is disconnected, do not select EMERGENCY.

4 W Pulling the CANOPY JETTISON T-handle other than straight out may cause the handle to jam.

5 If conditions permit, consider a go-around if the brakes are found to be inoperative on landing. An approach-end cable arrestment is recommended.

6 C Release brakes prior to changing brake channels or turning antiskid off.

7 C If in a congested area, use the parking brake immediately to stop.

5 1/4 ″ Page

GROUND EGRESS

1. Throttle – OFF.
2. Ejection safety lever – Safe (up).
3. Harness and personal equipment – Release.
4. EPU sw – OFF (time permitting). 1W
5. Canopy – Open. 2W

If canopy does not raise:

6. OXYGEN – 100%. 3W
7. Canopy – Jettison. 4W

BRAKE FAILURE

Accomplish as many steps as required: 5

1. BRAKES channel sw – Change channels. 6C
2. BRAKES channel sw – CHAN 2.
3. ANTI-SKID sw – OFF. 6C
4. NWS – Engage (if required).
5. HOOK sw – DN.

If an arresting cable is not available or if at low groundspeed:

6. ANTI-SKID sw – Intermittent PARKING BRAKE, then ANTI-SKID. 7C

END

5 1/2 ″ Page

OTHER CONSIDERATIONS:

1 Use of maximum symmetric pedal pressure provides the best stopping performance. Differential brake only when essential for directional control. If the ANTI SKID caution light illuminated above 5 kts groundspeed, the aircraft may oscillate due to pulsating brake pressure (if 15 percent or greater differential pedal pressure is applied). Changing brake channels may restore normal braking.

2 C No antiskid protection is available with the ANTI-SKID sw in OFF and BRAKES channel sw to CHAN 2. Brakes should be applied with caution to avoid wheel lockup and blown tires.

5 1/2 ″ Page

ANTISKID MALFUNCTION (GROUND)

If the ANTI SKID caution light illuminates (with the ANTI-SKID switch in ANTI-SKID):

1. DRAG CHUTE sw – DEPLOY (if required).
2. Brakes – Apply as needed. [1]
3. NWS – Engage (if required).

If manual braking is desired or after aircraft is stopped:

4. BRAKES channel sw – CHAN 2.
5. ANTI-SKID sw – OFF. [2][C]

ANTISKID MALFUNCTION (LANDING)

If the ANTI SKID caution light illuminates (with the ANTI-SKID sw in ANTI-SKID) when the LG handle is lowered:

1. BRAKES channel sw – CHAN 2.

If the ANTI SKID caution light remains on:

2. Refer to ANTISKID MALFUNCTION (GROUND), page F-9.

END

5 3/4 ″ Page

OTHER CONSIDERATIONS:

1 The following hook engagement limits apply for all aircraft. Arrestment at higher speeds may damage the aircraft.

BAK-6/-9/-12/-13/-14, MAAS, and *44B-2L
Routine 146 kts (*156 kts)
Emergency 160 kts (*171 kts)

2 Attempting to engage an unmodified (nonhook capable) MA-1A will most likely be unsuccessful.

3 W ● The hook may miss the cable if the aircraft is not slow enough to compress the MLG struts sufficiently to make WOW or if forward stick pressure is held.

● To prevent hook bounce and possible missed engagement, avoid runway centerline lighting.

4 • Approach-end arrestment: Touch down at least 500 ft in front of the cable.

• Departure-end arrestment: HOOK sw to DN at least 1500 ft before reaching the cable.

5 W Using forward stick pressure to keep an abnormally fast aircraft on the runway for cable engagement will probably result in a missed engagement or failure of the nose tire/NLG.

6 C Do not use brakes while the cable is stretched or while being pulled backward. This action can result in aircraft tipping backward. Control rollback with the throttle.

5 3/4 ″ Page

CABLE ARRESTMENT 1 2 3W

1. GW – Reduce (as required).
2. HOOK sw – DN. 4
3. SHOULDER HARNESS knob – LOCKED.
4. Consider options available if a missed engagement occurs.

Prior to cable engagement:

5. Throttle – IDLE.
6. NWS – Engage (if required).
7. Engage cable as close to center as possible; nosewheel on the runway (if required) and brakes off. 5W 6C

NET ARRESTMENT

1. SHOULDER HARNESS knob – LOCKED.
2. Brakes – Release prior to engagement.
3. Throttle – Off prior to engagement.

(Cont)

OTHER CONSIDERATIONS:

7 W The canopy should be retained throughout the engagement to provide pilot protection. Barrier netting will not prevent subsequent canopy opening/jettison.

8 C Engage net perpendicular to preclude aircraft rotating sideways during the arrestment. Avoid steering back toward the center of the runway just prior to engagement as this could result in a non-perpendicular engagement. Nosewheel steering is not required; however, if engaged, it may be left engaged. The throttle should be retarded to off prior to engagement to reduce the possibility of foreign object damage.

4. Engage net perpendicular, preferably in the center portion of the runway. 7W 8C

END

5 7/8 ″ Page

OTHER CONSIDERATIONS:

1 Inform landing base of hydrazine leak or EPU operation and request bioenvironmental services support.

2 W Treat any leak as a hydrazine leak until investigation proves otherwise.

3 Consider turning the ECS off to prevent the possibility of hydrazine fumes or EPU exhaust gases entering the cockpit.

4 C ● If AIR SOURCE knob is placed to OFF, also turn off nonessential avionic equipment as electronic equipment may be damaged.

● If AIR SOURCE knob is placed to OFF, OBOGS caution light will illuminate. If OXY LOW warning light illuminates before ground crew arrives with oxygen bottle, activate EOS.

5 To prevent sitting in a sealed cockpit (hot) without ECS, consider waiting for ground crew to arrive with ladder and oxygen bottle prior to shutting down the engine.

5 7/8 ″ Page

ACTIVATED EPU/HYDRAZINE LEAK

If landing with an activated EPU or a hydrazine leak is detected while the engine is running: 1 2W

1. OXYGEN – 100%.

When on the ground:

2. AIR SOURCE knob – OFF (if required). 3 4C
3. Taxi to designated isolated parking area (if required) and park aircraft with left wing into wind if possible.
4. Insure all nonessential personnel are clear.
5. EPU sw – OFF.
6. Shut down the engine (after left main wheel is chocked). 5

END

OTHER CONSIDERATIONS:

1 W NWS malfunctions at any speed may cause an abrupt turn, tire skidding or blowout, aircraft tipping, and/or departure from the prepared surface.

2 If the drag chute is deployed below approx 190 kts, it does not break away from the aircraft.

6 1/4 ″ Page

NWS FAILURE/HARDOVER 1 W

1. NWS – Disengage.
2. AR/NWS light – Verify off.
3. Rudder and brakes – As required.

DRAG CHUTE DEPLOYED IN FLIGHT

If the drag chute is deployed in flight below 190 kts: 2

1. DRAG CHUTE sw – REL.

If the drag chute does not release:

2. Throttle – MAX AB.

DRAG CHUTE FAILURE

If decision is made to go-round:

1. Drag chute – Release.
2. Throttle – MAX AB.

END

6 1/2 ″ Page

OTHER CONSIDERATIONS:

[1] ● Certain ECS equipment malfunctions result in temporary shutdown of the ECS and illumination of the EQUIP HOT caution light.

● An ECS shutdown and EQUIP HOT caution light illumination for up to 2 minutes can occur either during extended LG down flight between sea level and 7000 ft MSL or during operation above a line from 42,000 ft MSL at 0.2 mach to 50,000 ft MSL at 0.95 mach. These ECS shutdowns are normal, but may still require additional action if the EQUIP HOT caution light remains on for more than 1 minute.

● If cockpit temperature is excessive, refer to COCKPIT PRESSURE/TEMPERATURE MALFUNCTION, page F-21.

[2] If in VMC and the ADI and HSI are not required for flight, the EGI should be considered nonessential.

6 1/2 ″ Page

EQUIP HOT CAUTION LIGHT

If EQUIP HOT caution light illuminates: [1]

1. AIR SOURCE knob – Confirm in NORM if smoke or fumes are not present.
2. Throttle – 80 percent rpm min (in flight).

If EQUIP HOT caution light remains on after 1 minute:

3. Nonessential avionics – Off. [2]
4. Land as soon as practical.

OBOGS MALFUNCTION

If OXY LOW warning light illuminates:

1. OXYGEN regulator pressure and cockpit altitude – Check.

If pressure is less than 5 psi and cockpit altitude is above 10,000 ft, or if pressure is greater than 5 psi and cockpit altitude is above 25,000 ft:

2. EOS – Activate.
3. Altitude – Descend to cockpit altitude below 10,000 ft.
4. Land as soon as practical.

(Cont)

6 3/4 ″ Page

OTHER CONSIDERATIONS:

3 Do not exceed cockpit altitude of 10,000 ft.

4 Partial pressure of oxygen is sufficient for operation in 100% but is not sufficient for operation in NORM.

5 Partial pressure of oxygen is not sufficient.

6 OBOGS monitor has failed.

7 Returns OXY LOW warning light to steady.

If pressure is less than 5 psi and cockpit altitude is below 10,000 ft:

2. Land as soon as practical. [3]

If pressure is greater than 5 psi and cockpit altitude is below 25,000 ft:

2. Diluter lever – 100%.

If OXY LOW warning light goes off within 10 sec: [4]

3. Continue mission with diluter lever in 100%.

If OXY LOW warning light remains on or diluter lever was in 100% when light illuminated:

4. OBOGS BIT sw – BIT.

If OXY LOW warning light remains on steady: [5]

5. EOS – Activate if cockpit altitude is above 10,000 ft.
6. Altitude – Descend to cockpit altitude below 10,000 ft.
7. Land as soon as practical.

If OXY LOW warning light begins flashing when BIT is selected: [6]

5. OBOGS BIT sw – BIT. [7]
6. Altitude – Descend to cockpit altitude below 10,000 ft.
7. Land as soon as practical.

END

6 5/8 ″ Page

OTHER CONSIDERATIONS:

1 All unidentified odors will be considered toxic. Do not take off when unidentified odors are present. Do not confuse ECS condensation for smoke.

2 The emergency oxygen bottle is not recommended for use in the smoke and fumes environment unless aircraft oxygen supply contamination is suspected. Activation of the emergency oxygen bottle does not prevent cockpit smoke or fumes from entering the oxygen mask.

3 External fuel cannot be transferred in OFF or RAM. Consider jettisoning tank(s) to decrease drag if range is critical and the ECS cannot be turned on for short periods of time to transfer fuel.

4 W If AIR SOURCE knob is placed to OFF or RAM, OBOGS is inoperative. Activate EOS if OXY LOW warning light illuminates above 10,000 ft cockpit altitude.

5 If in VMC and the ADI and HSI are not required for flight, the EGI should be considered nonessential.

6 ● Smoke in the cockpit may be indicative of an engine oil system malfunction. If possible, retard throttle to lowest setting possible to sustain flight and monitor the OIL pressure indicator. Refer to OIL SYSTEM MALFUNCTION, page C-19, if appropriate.

● Any odor that smells of burning flesh may be indicative of bird ingestion into the engine. Monitor engine instruments for signs of abnormal operation.

6 5/8 ″ Page

PBG MALFUNCTION

If excessive pressure is experienced or high pressure continues after g is reduced:

1. OXYGEN mode lever – ON.

If pressure is not relieved:

2. Oxygen hose – Disconnect.
3. Cockpit pressure altitude – 10,000 ft max.

If unable to descend immediately:

4. Emergency oxygen – Activate.
5. Land as soon as practical.

SMOKE OR FUMES [1]

If smoke or fumes are detected:

1. OXYGEN REGULATOR – Check ON, 100%, and EMER. [2]
2. Altitude – 25,000 ft max.
3. Airspeed – 500 kts max.
4. AIR SOURCE knob – RAM. [3] [4W]
5. Nonessential electrical equipment – Off. [5]
6. Determine cause of smoke or fumes and correct (if possible). [6]
7. Land as soon as possible.

If cockpit visibility precludes safe operation:

8. Airspeed – 180 kts max.
9. Seat – Full down.
10. ALT FLAPS sw – EXTEND.
11. Canopy – Jettison.

END

OTHER INDICATIONS:

• CABIN PRESS caution light.

OTHER CONSIDERATIONS:

1 W ● With the ECS shut down or the AIR SOURCE knob in OFF or RAM, the g-suit does not inflate and PBG is disabled.

● With the ECS shut down or the AIR SOURCE knob in OFF or RAM, OBOGS is inoperative. Activate EOS if OXY LOW warning light illuminates above 10,000 ft cockpit altitude.

2 The OBOGS caution light may illuminate as a result of ECS cycling or temporary ECS shutdown. This is normal as long as the OXY LOW warning light does not illuminate.

3 Most AUTO position temperature failures can be corrected by use of the MAN position.

4 The OBOGS caution light illuminates while AIR SOURCE knob is in OFF.

5 W If AIR SOURCE knob is placed to OFF or RAM, OBOGS is inoperative. Activate EOS if OXY LOW warning light illuminates above 10,000 ft cockpit altitude.

6 External fuel cannot be transferred in OFF or RAM. Consider jettisoning tank(s) to decrease drag if range is critical and the ECS cannot be turned on for short periods of time to transfer fuel.

7 If in VMC and the ADI and HSI are not required for flight, the EGI should be considered nonessential.

COCKPIT PRESSURE/TEMPERATURE MALFUNCTION
1W 2 3

If the cockpit temperature is excessive and does not respond to AUTO or MAN temperature commands or cockpit pressure is lost, proceed as follows:

1. OXYGEN – 100%.
2. Altitude – 25,000 ft max.
3. Airspeed – 500 kts max.
4. AIR SOURCE knob – OFF (10-15 sec), then NORM. 4

If cockpit pressure is not regained but all other systems dependent on the ECS are operational:

5. Flight may be continued below 25,000 ft.

If ECS has failed or cockpit temperature control is not regained:

5. AIR SOURCE knob – OFF. 5W
6. AIR SOURCE knob – RAM (after cockpit is depressurized). 5W 6
7. Nonessential electrical equipment – Off. 7
8. Land as soon as practical.
9. Check for failed emergency dc bus(es). Refer to EMERGENCY POWER DISTRIBUTION, page A-19.

END

7 1/4 ″ Page

OTHER CONSIDERATIONS:

1 W Failure to remove night vision goggles (NVG) prior to ejection may cause serious injury. If unable to remove NVG, a proper ejection body position (head back against the seat headrest) reduces the chance of injury from the NVG.

2 Slow to lowest practical airspeed.

3 W If canopy is jettisoned or manually released/opened after pulling the ejection handle, the ejection seat functions immediately after canopy separation. Be prepared to immediately put arm back in ejection position when the canopy starts to separate.

4 W Pulling the CANOPY JETTISON T-handle other than straight out may cause the handle to jam.

5 W Use of the CANOPY JETTISON T-handle or MANUAL CANOPY CONTROL handcrank may result in serious injury. To minimize chances of injury, immediately release the handle when the canopy starts to separate.

7 1/4 ″ Page

EJECTION

Ejection (Immediate)

1. Ejection handle – Pull.

Ejection (Time Permitting)

1. IFF MASTER knob – EMER.
2. Loose equipment and checklist – Stow.
3. Lapbelt and helmet chin strap – Tighten.
4. Night vision devices – Remove (if appropriate). 1 W
5. Visor – Down.
6. Throttle – IDLE. 2
7. Assume ejection position.
8. Ejection handle – Pull.

Failure of Canopy To Separate 3 W

1. Canopy – Open normally.
2. Canopy – Jettison. 4 W
3. MANUAL CANOPY CONTROL handcrank – Push in and rotate ccw. 5 W

END

OTHER CONSIDERATIONS:

1 W ● Arms must be kept close to body to avoid letting wind blast pull arms out of the cockpit.

● HUD glass disintegration can be expected following medium to high energy bird strike with or without canopy penetration.

CANOPY MALFUNCTIONS

CANOPY Warning Light On

If CANOPY warning light illuminates:

1. Canopy handle – Push outboard.

If CANOPY warning light remains on:

2. Go to CANOPY LOSS/PENETRATION IN FLIGHT, below.

Canopy Loss/Penetration in Flight 1W

1. Airspeed – 180 kts max.
2. Seat – Full down.
3. ALT FLAPS sw – EXTEND.
4. Land as soon as possible.

Failure of Canopy To Separate

Go to EJECTION, page F-23.

END

7 3/4 ″ Page

OTHER CONSIDERATIONS:

1 D Store and station selections can be made from either cockpit.

2 C ● Jettison of an inboard shoulder-mounted store from a TER at station 4 or 6 with MLG down may result in LG and store(s) collision. To avoid this, select RACK for jettison instead of WPN.

● Jettison of external wing fuel tanks with stores/suspension equipment at stations 3 and/or 7 with MLG down may result in LG and external wing fuel tank collision.

● Failure to load the actual stores configuration into SMS inventory could cause damage to the aircraft by inhibiting the selective jettison release time delay used to insure safe 370/600-gallon fuel tank separation when a store is present at station 3 or 7.

● Selective jettison airspeed/mach limits in T.O. GR1F-16CJ-1-2, are only valid for:

- Selective jettison of one store type at a time.
- Selective jettison from nonadjacent stations.

If simultaneous selective jettison of either more than one store type or from adjacent stations is required, adhere to emergency jettison airspeed/mach limits.

3 ● Weapon(s) and/or rack(s) to be jettisoned is highlighted.

● When 300-gallon and 370/600-gallon fuel tanks are carried simultaneously, the 300-gallon fuel tank must be separated prior to the 370/600-gallon fuel tanks.

4 When jettisoning tanks from stations 4 and 6, hold release button depressed for 1 sec.

5 Use EMER STORES JETTISON on the ground only as a last resort.

6 W Emergency jettison is not available if an MMC FAIL PFL message is present. Emergency jettison can be restored by placing the MMC sw to OFF.

7 If the initial actuation of the EMER STORES JETTISON button fails to jettison all aircraft stores, subsequent attempts may successfully release the remaining stores.

SELECTIVE JETTISON

1. GND JETT ENABLE sw – ENABLE (if LG is down).
2. MASTER ARM sw – MASTER ARM.
3. DR ARMT CONSENT sw – On.
4. ST STA sw – ST STA.
5. DOG FIGHT sw – Center.
6. MFD – SMS format. 1
7. S-J OSB (MFD) – Depress.
8. S-J PAGE (MFD) – Select stores desired for jettison. 2 C 3
9. WPN REL – Depress. 4

EMERGENCY JETTISON

1. GND JETT ENABLE sw – ENABLE (if required). 5
2. EMER STORES JETTISON button – Depress (1 sec). 6 W 7

END

INDICATIONS OF TOTAL EGI FAILURE:

- AVIONICS FAULT CAUTION LIGHT.
- ADI AUX WARNING FLAG.
- ADI OFF WARNING FLAG.
- HSI COMPASS CARD FROZEN.
- ADI FROZEN/TUMBLED.
- HUD PITCH LADDER, HEADING SCALE, ROLL SCALE, AND FPM ALSO BLANK.
- PFL CODE INS BUS FAIL.
- FLCC AOS feedback function is deactivated.

OTHER CONSIDERATIONS:

1 W It is possible for the displayed ADI and/or HUD attitude to be in error with no ADI OFF or AUX warning flags in view and without an EGI or HUD MFL/PFL. Displayed HSI and/or HUD headings may also be in error with no HSI OFF or ADI AUX warning flags in view and without an EGI or HUD MFL/PFL. Momentary warning flags may indicate impending failure. To detect these failures and maintain proper flight orientation, basic and backup instruments must be cross-checked.

2 W The autopilot does not automatically disengage with EGI failures. Failure to manually disconnect the autopilot may result in an unusual aircraft attitude and disorientation.

3 Constant altitude (± 200 ft) coordinated turns (bank angle less than 45°) to change heading by 45° to 90° and holding the heading for 1 min will assist completion of the alignment.

EGI FAILURE 1W 2W

If ADI OFF and AUX flags are in view or attitude is erroneous:

1. EGI knob – OFF for 10 sec.
2. Attitude – Establish straight, level, and unaccelerated flight.
3. EGI knob – AUTO IFA.
4. Attitude – Maintain straight, level, and unaccelerated flight until ALIGN replaces STBY in the HUD and ADI AUX flag is out of view.
5. In-flight alignment – Accomplish. 3
6. EGI knob – NAV after Max-g replaces ALIGN in the HUD and RDY is removed from the DED EGI page.
7. ADI, HUD, and HSI – Verify accuracy of attitude and navigation data.

(Cont)

OTHER CONSIDERATIONS:

[4] Fix taking procedures may be required as indicated on the DED MAN INFLT ALIGN page.

If the AUTO IFA fails to complete after 10 min, consider attempting a MAN IFA with GPS or with fix taking:

8. EGI knob – OFF for 10 sec.
9. Attitude – Establish straight, level, and unaccelerated flight.
10. EGI knob – MAN IFA.
11. Enter best available magnetic heading on the DED MAN INFLT ALIGN page.
12. Attitude – Maintain straight, level, and unaccelerated flight until ALIGN replaces STBY in the HUD and ADI AUX flag is out of view.
13. In-flight alignment – Accomplish. [3] [4]
14. EGI knob – NAV after Max-g replaces ALIGN in the HUD and RDY is removed from the DED EGI page.
15. ADI, HUD, and HSI – Verify accuracy of attitude and navigation data.

If the MAN IFA fails to complete after 10 min, the attitude mode should be attempted:

16. EGI knob – OFF for 10 sec.
17. Attitude – Establish straight, level, and unaccelerated flight.
18. EGI knob – ATT.
19. Attitude – Maintain straight, level, and unaccelerated flight until ADI OFF warning flag goes out of view after approx 10 sec.
20. ADI and HUD – Verify attitude information is correct.
21. [C] [DF] INSTR HDG knob – Slew HSI to match best available magnetic heading.

END

OTHER CONSIDERATIONS:

[1] Insure that AR/NWS light is off prior to landing so that the NWS does not follow rudder commands when the nosewheel is lowered to the runway.

[2] From the front cockpit, the top of the speedbrakes should be slightly above a line drawn from the tip of the horizontal tail to the top of the vertical tail root fairing.

[3] [C] Visually confirm speedbrake opening is limited to 43° to prevent the lower surfaces from striking the runway during landing.

[4] [W] ● If a hot brake condition is a result of a dragging brake, taxiing the aircraft worsens the condition.

● Any leaking hydraulic fluid may be ignited by hot wheel and brake surfaces.

● Wheel fusible plugs may relieve tire pressure at anytime during the 15 minutes after brake application.

● With hot brakes, avoid inflated MLG tire side area within 300 feet for 45 minutes after aircraft has stopped. If required, approach from front or rear for firefighting purposes only.

[5] [W] ● Do not use the parking brake.

● If battery power is not available, toe brakes will be inoperative after engine shutdown.

● Do not turn MAIN PWR sw to OFF until the nosewheel is chocked.

● Attempt to park in a level area to minimize risk of aircraft rolling if the brakes should fail after shutdown.

[6] [C] Use only minimum possible toe brake pressure to hold aircraft stationary until engine is shut down and nose wheel is chocked.

NLG WOW SWITCH FAILURE

1. NWS – Engage.

If AR/NWS light comes on:

2. NWS – Disengage.
3. AR/NWS light – Off. 1
4. Speedbrakes – Close to less than 43°. 2 3C

HOT BRAKES

Perform the following after any event that may result in hot brakes:

1. Request firefighting equipment and proceed directly to the designated hot brake area or nearest area clear of other aircraft and personnel. 4W

When in the hot brake area:

2. Align aircraft with nose into wind if possible. 5W 6C
3. EPU sw – OFF.
4. Throttle – OFF.
5. Nose wheel – Chocked.
6. MAIN PWR sw – OFF.
7. Exit toward the front of the aircraft.

If a brake fire occurs:

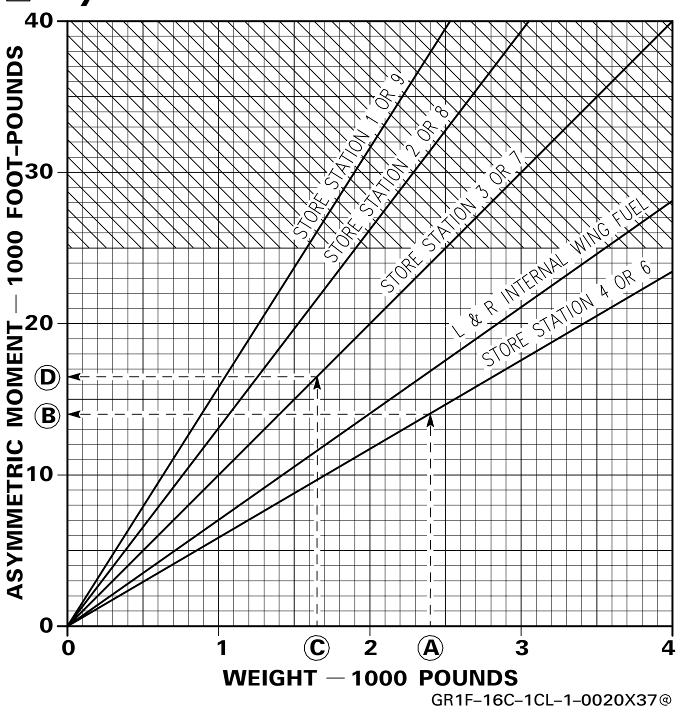
8. Go to GROUND EGRESS, page F-7.

END

OTHER CONSIDERATIONS:

1 W Large asymmetric loads severely limit lateral control when rolling away from the heavy wing. Until determining net asymmetry, limit max bank angle change to 90°, avoid abrupt control inputs, and do not exceed 10° AOA.

2 *Asymmetric Moment*



3 Selectively jettison stores from the heavy wing to obtain a net asymmetry less than 25,020 ft-lb. Refer to SELECTIVE JETTISON, page F-27.

ASYMMETRIC STORES (LANDING)

1. AOA – 10° max. 1 W
2. Determine net asymmetry. 2

If asymmetry is greater than 25,020 ft-lb:

3. Stores – Jettison (as required). 3

(Cont)

OTHER CONSIDERATIONS:

4 ● Lower LG at a safe altitude and check handling qualities until roll authority is insufficient or up to 12° AOA max.

● Max maneuvering AOA for approach and landing is 10° AOA or 2° less than the AOA at which roll authority is insufficient to maintain wings level, whichever is less.

5 W The decision to land with a large asymmetry should consider such factors as weather conditions, runway length/width and surface conditions (RCR), arresting gear availability, crosswind component/gusts, and pilot experience.

6 W ● With crosswind component greater than 10 kts (5 kts if the net asymmetry exceeds 20,000 ft-lb), land with heavy wing into the crosswind even if this results in landing downwind. Failure to do so may result in inadequate roll control.

● Do not exceed the max AOA, as determined during the controllability check, during final approach, flare, touchdown, or two-point aerodynamic braking.

If asymmetry is greater than 10,000 ft-lb:

4. Controllability – Check. 4

If landing is feasible: 5W

5. Fly a shallow, power-on, straight-in approach. 6W
6. Roll trim and lateral stick – As required.
7. Rudder trim – Trim into the heavy wing (if required).

If landing is not feasible:

5. Go to EJECTION (TIME PERMITTING), page F-23.

If asymmetry is less than 10,000 ft-lb:

4. Land normally.

END

NOTES:

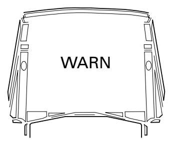
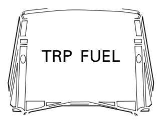
Warning/Caution Lights

LIGHT	REMARKS
SEAT NOT ARMED	Ejection safety lever up (system safe)
STORES CONFIG	STORES CONFIG sw is in incorrect position or loading category in SMS software disagrees with actual GP/ STORE/LINE loading category. Verify STORES CONFIG sw is in proper position for aircraft loading category
BUC	None
EEC	None
ATF NOT ENGAGED	If in ATF, climb to a safe altitude and verify: • AIR REFUEL sw CLOSE • ALT FLAPS sw NORM • TRIM/AP DISC sw NORM • No CADC failures **NOTE:** Deselect ATF until the cause of the caution light illumination can be determined.
RADAR ALT	Malfunction of radar altimeter
IFF (Mode 4)	MODE 4 REPLY sw in OUT with CNI knob in BACKUP; zeroized or not coded; correct code not selected (A or B); code does not match code interrogation; mode 4 inoperative; or RF sw in QUIET or SILENT
INLET ICING	If in areas of known or suspected icing conditions, position engine ANTI ICE sw to ON
HOOK	Hook not up and locked

Warning/Caution Lights

LIGHT	REMARKS
OBOGS	The ECS pressure has dropped below 10 psi, interrupting oxygen production. Attempt to increase ECS air pressure by increasing throttle setting, increasing airspeed, and/or decreasing altitude
AVIONICS FAULT	Several causes. Note PFL display(s) on PFLD and depress C DF F-ACK, DR FAULT ACK button to acknowledge fault(s) and to reset AVIONICS FAULT caution light. Perform fault recall(s) as desired to determine if the failure condition still exists
TO/LDG CONFIG	All LG not down and locked or TEF's not fully down with LG handle down
NUCLEAR	Malfunction in nuclear circuitry
PROBE HEAT	Ground: Place PROBE HEAT sw to OFF for 1 minute (caution light goes off) when OFF is selected); then reselect PROBE HEAT. If caution light comes on simultaneously with reselection of PROBE HEAT, a probe heater or monitoring system failure has occurred. If caution light does not come on when PROBE HEAT is reselected, one/both AOA probe heaters were shut off to prevent overheat
	In Flight: Probe heater(s) or monitoring system failure. Place PROBE HEAT sw to PROBE HEAT, if required, and avoid areas of known or suspected icing conditions

Warning/Caution Lights

LIGHT	REMARKS
	Check for specific illuminated warning light
	A trapped external fuel condition is detected

NOTES:

SECTION AR

AIR REFUELING PROCEDURES

WITH KC-135, KC-10, AND KDC-10

TABLE OF CONTENTS

NORMAL AIR REFUELING PROCEDURES

Armament Safety Check

1. MASTER ARM switch – OFF or SIMULATE.
2. LASER ARM switch – OFF.
3. SMS – Confirm ordnance safe.
4. CMDS switches (9) – OFF.

Precontact

1. TACAN – As required.
2. Emitters (ECM/FCR/RDR ALT) – As required (Quiet/Silent/STBY/OFF).
3. HOT MIC CIPHER switch – HOT MIC.
4. Exterior lights (Night) – DIM, STEADY.
5. ANTI COLLISION light switch (Night) – OFF.
6. AIR REFUEL switch – OPEN.
7. AR status indicator light – RDY.

Contact

1. AR status indicator light – AR/NWS.
2. Fuel transfer – Monitor.

Disconnect

1. A/R DISC button – Depress momentarily, then release.
2. AR status indicator light – DISC.

Post Air Refueling

1. AIR REFUEL switch – CLOSE.
2. AR status indicator lights(3) – Off.
3. Fuel quantity – Check.
4. MASTER ARM switch – As required.
5. SMS – As required.
6. CMDS switches (9) – As required.
7. ECM – As required.
8. TACAN – As required.
9. FCR/Radar – As required.
10. RDR ALT – As required.
11. LASER ARM switch – As required.
12. Exterior lights – As required.

Visual Signals

SIGNAL	INDICATION
1. Boom in Trail	
(a) Extended 10 feet	Ready for contact *
(b) Fully extended	1. Tanker manual operation without tanker disconnect capability 2. Acknowledge receiver's MBL signal
(c) Fully retracted	Offload complete
2. Boom Stowed	
(a) Fully retracted	Tanker air refueling system inoperative
(b) Extended 5 feet	System malfunction, tanker and receiver check air refueling systems
3. Flashing receiver director lights/Tanker lower rotating beacon ON	BREAKAWAY
4. Receiver director lights going OUT during contact **	Tanker request for disconnect, receiver return to precontact position
5. Receiver closing and opening receptacle door when in precontact position	1. Manual Boom Latching 2. Acknowledge tanker's manual operation without tanker disconnect capability signal
6. Steady light from receiver or rocking of wings ***	Emergency fuel shortage exists
7. Flashing light from receiver cockpit area	Initiate toboggan maneuver

Visual Signals – (Cont)

SIGNAL	INDICATION	
	BOOM AIR REFUELING	PROBE & DROGUE RE-FUELING
8. (a) Same receiver returns to precontact with re–ceptacle door open (DAY): Pilot signals closed fist, thumb to mouth plus hand signaling number (NIGHT): Same receiver returns to pre–contact with receptacle door open, ready for contact ****	Additional fuel required–EM–CON 2–4	
(b) Same receiver returns to precontact ready for contact (DAY): Pilot signals closed fist plus hand signaling number (NIGHT): Same receiver returns to pre–contact ready for contact ****		Additional fuel required–EM–CON 2–4

* Receiver(s) in the observation position will move to the precontact position in their briefed sequence only after insuring that the boom is in the ready for contact position and the preceding receiver has cleared the tanker. The receiver will stabilize in the precontact position, then move to the contact position. The boom operator will not give the ready for contact signal until the preceding receiver has cleared the tanker.

** The receivers will advise the tanker of any pilot director light malfunctions/ deficiencies.

*** If fuel shortage occurs at times other than scheduled air refueling, the receiver should be positioned so the signal may be seen from the tanker cockpit.

**** Additional fuel offloaded will be 5M for large receiver aircraft, 2M for small receiver aircraft, on each subsequent contact.

NOTES:

8 1/2 ″ Page

OTHER CONSIDERATIONS:

[1] A small amount of fuel spray from the nozzle and receptacle during fuel transfer does not require fuel transfer to be terminated. The receiver pilot should be notified if this condition exists and the air refueling operations will be continued or discontinued at his discretion.

[2] Normal FLCS gains and tank pressures will be regained.

[3] The RDY, AR/NWS, and DISC lights will not indicate normally. The NWS light will not illuminate when nosewheel steering is engaged.

[4][W] The receiver pilot must inform the tanker he is ready to receive fuel and coordinate the disconnect cycle for the conclusion of refueling.

[5][C] Prior to attempting this method of transferring fuel, the boom operator will brief the receiver pilot and thoroughly coordinate the procedures to be used. Both tanker and receiver crews will monitor the refueling with extreme caution.

[6][W] ● When notified that a KC-10/KDC-10 boom flight control system failure has occurred, do not initiate a disconnect unless directed by the boom operator.

● Follow the boom operator's instruction explicitly. To reduce the probability of boom strike after disconnect, it may be necessary to remain in a stabilized position to allow for aerodynamic fairing of the boom control surfaces.

SYSTEM MALFUNCTIONS

When any system malfunction or condition exists which could jeopardize safety, air refueling will not be accomplished except during fuel emergencies or when continuance of fueling is dictated by operational necessity. 1

Slipway Door Will Not Open

No back-up system is provided to open or close the slipway door if hydraulic system B fails.

Slipway Door Will Not Close

1. AR switch – CLOSE. 2 3

Inoperative Boom/Receptacle Latching

If fuel shortage requires:

1. Boom operator – Inform of the need to accomplish manual boom/receptacle pressure refueling. 4W 5C

KC-10/KDC-10 BOOM FLCS FAILURE

Do not disconnect until cleared by boom operator. 6W

OTHER CONSIDERATIONS:

[1] Enter any brute force disconnect as a discrepancy in the AFTO Form 781. The entry will specify which type of brute force disconnect occurred.

[2][C] Following an inadvertent brute force disconnect, air refueling will be terminated except during fuel emergencies or when continuation of air refueling is dictated by operational necessity.

[3][C] ● A controlled tension brute force disconnect will be accomplished only as a last resort, after all other normal and emergency methods of disconnect have failed.

● The receiver pilot must not jerk the boom out with rapid thrust change toward IDLE or by using speedbrakes; to do so may cause serious structural damage. Gradual power reduction will suffice to effect a disconnect.

● Fly stabilized at contact altitude until certain the nozzle is clear of the receptacle and slipway.

● Air refueling for the receiver which required controlled tension disconnect will be terminated except during fuel emergencies or when continuation of air refueling is dictated by operational necessity.

BRUTE FORCE DISCONNECT 1

Inadvertent Disconnect

An inadvertent brute force disconnect is defined as any unplanned disconnect which is the result of one of the following:

- The receiver aircraft moving rapidly to the aft limit, causing mechanical tanker/receiver separation.
- Boom pullout occurs at 38 degrees elevation or below. 2 C

Controlled Tension Disconnect

1. Slide out boom with gradual power reduction.
2. When at full boom extension, tension disconnect will occur with slight power reduction. 3 C

NOTES: